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PSYCHOLOGY  
FOR MUSIC TEACHERS.



# PSYCHOLOGY FOR MUSIC TEACHERS.

THE LAWS OF THOUGHT APPLIED TO SOUNDS AND  
THEIR SYMBOLS, WITH OTHER  
RELEVANT MATTER.

BY

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"The Pianist's Mentor," &c.



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## PREFACE.

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THE main purpose of this book is to offer some assistance to teachers of music in their daily work. So much is implied in its title. When the author commenced his career as a teacher no such book was in existence, or was regarded as desirable. In other subjects a little work had been done by educationists, and this has gradually culminated in the issue of large and important treatises by eminent writers. Of the value of such treatises it is unnecessary to say anything here, but they have the drawback that, so far as the average teacher of music is concerned, they contain a great deal of extraneous and unnecessary matter. That this is a disadvantage in the case of most teachers of music will not be denied, for they wish for the most practical and direct information on the topics which concern their work. Even in the case of those persons, whether members of the musical profession or not, who make a serious study of Psychology, large and ponderous volumes are of doubtful advantage at first. That this is the case so far as solitary students are concerned the present writer can testify most emphatically, and the same drawback exists in other subjects of study. A careful study of the following pages will be found of value as a preliminary to the perusal of more elaborate treatises.

If we agree with Pope that

“The proper study of mankind is man,”

we shall also agree that man's nobler part, the intellect, is the most interesting and important part of that study. How fascinating that study, as developed in works on Psychology, can be made, especially if practical work be adapted to the theories which have been evolved, is well known to the votaries of the subject. By the employment of suitable devices, an efficient clue to the labyrinth of the human mind can be devised, and the enthusiastic teacher will never despair of ultimate success, however unpromising are the pupils who are placed under his supervision. Readers will see in the succeeding pages that such a clue consists of the discovery of suitable percepts and concepts. The most obscure and difficult labyrinth of the kind just spoken of is found in the case of those unfortunate persons who are deprived of both the higher senses, sight and hearing. At a first glance it would appear impossible to penetrate obstacles such as these. Yet we know that the most interesting and surprising results have been gained by the employment of suitable means. The first case to attract public attention was that of Laura Bridgman, mentioned by Charles Dickens in his *American Notes*, who was entirely devoid of the higher senses and had the senses of taste and smell in a very imperfect form. The latest case to become widely known is that of Helen Keller who, even when compared with her more fortunate contemporaries, is highly educated. In such cases as these the sense of touch, aided by the muscular sense, have been found amply sufficient to convey the most abstruse forms of knowledge to the afflicted student. It may be taken for granted that if any, even the most rudimentary, percept can be conveyed to the mind, ultimate success is assured. Yet there have been persons who have asserted, *à priori*, that darkened intellects, such as have been

described, can never be illuminated. Such statements illustrate very happily the old adage that "An ounce of practice is worth a pound of theory."

The term Psychology is so widely known that it is, in many cases, employed without any real meaning being attached to it, somewhat like the devout old lady's "Blessed word Mesopotamia." Sometimes in a critic's notice of a new musical composition, he speaks of its psychological contents. What does he mean, or does he attach any definite meaning to such an expression? Looked at with a due sense of the meaning of words we may say that the whole of any musical composition is an illustration of Psychology. This may be said of the most frivolous comic song equally with the most profound orchestral work. But the critic would scout the idea that there was any Psychology in a comic song or a waltz. Such being the case it would be interesting to have his definition of Psychology. He, with extreme indignation, would probably reply that the above remarks "were, to him, a most interesting psychological study." This form of withering sarcasm is very popular with speakers and writers of the present day. Wherever found, it suggests that the person who made the remark is profoundly ignorant of the science of Psychology.

HENRY FISHER.

BLACKPOOL

*July, 1905.*

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# PSYCHOLOGY FOR MUSIC TEACHERS.

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## CHAPTER I.

### PRELIMINARY.

BEFORE proceeding to the formal enunciation of the principles which are discussed in the following pages, it will be convenient and profitable to have a survey of the ground which has to be covered. Archbishop Whately, in his "Logic," strongly advocates such a plan. His main divisions are—(1) An Analytical Outline; and (2) A Synthetical Compendium, of which the latter occupies by far the major part of the book. He contends that the path traversed in the analytical outline is that of the investigator, and that it is, in consequence, more interesting and stimulating to the student than the orderly building up of facts synthetically which we find in by far the larger number of text-books. There is no doubt of the truth of this, especially in the case of a solitary student. Yet it is true that there are few, if any, treatises on psychology in which any plan resembling that advocated by Archbishop Whately is employed. Doubtless greater precision is gained by a synthetic treatment of the subject, but such a plan renders the work of the student unnecessarily dry and laborious, especially in cases where it cannot be illuminated by the comments of a teacher. The present writer can speak feelingly on this point. Our first task will be, then, to take one or two concrete examples, and from them to indicate, very briefly, some of the principles which will engage our further attention.

A first-rate violinist, playing a concerto by one of the great composers, presents to us one of the most elevated examples of an artistic performance. Each member of the large audience

when listening to this performance will form a different conception of it. This conception will, of course, depend upon the natural feeling for music which is gained through heredity and environment added to the amount of culture which has been acquired by observation and study. There are, however, a few general types under which these listeners, with their conceptions and feelings, may be grouped. There is the amateur who is possessed of a mere smattering of music, and his chief object will be to look out for a pretty tune. He admires the great dexterity of the performer in his rapid and brilliant passages, quite oblivious of the fact that these passages by no means represent the greatest difficulties of the work in which they occur. There will be a few aspiring violinists present in the audience, and they will try to get as near to the performer as possible for the purpose of watching the action of his fingers and of his bow-arm. The music performed will occupy a very secondary position in their minds. The field of observation of the educated musician is very much more extended than those just described. He follows the themes, whether they come in the solo instrument with the accompaniment of the band, or whether, on the other hand, they are assigned to a wind instrument, when the violinist will have rapid and brilliant arpeggios, or some other device which shows his power as a performer. The course of modulation will be carefully followed by the listener now under consideration, as will the general construction and connection of the different movements of the concerto. The earnest teacher will try to learn something which will help him in his work. He will observe the dexterous movements of the performer, but he will be still more anxious to learn something from the artistic way in which he enunciates the melodies, especially in the "slow movement." He will gather many hints for his own work from the performance to which he has listened. If he is wise he will try to analyse the various operations which go to make up what is called the *technique* of the soloist. The muscular movements in the left hand are so rapid and complicated that they must appear at first sight to be executed without the intelligent

direction of the mind. This cannot be, of course, and we are forced to the conclusion that movements which, at first, are so slowly performed that each of them is distinctly apprehended by the mind, are afterwards grouped. These groups are at first small in extent, but are gradually enlarged as dexterity is gained. The mind takes in the groups in succession, but it is "begging the question" to assume that the separate notes are not grasped. We may speak of a certain combination of notes as a dominant 7th, but such a combination must be meaningless to anyone who does not distinctly apprehend each of the notes of which it consists. Returning to the muscular movements of the left hand it is of interest to observe that the slightest movement of a finger involves at least two muscles, an extensor and a flexor muscle, which must balance each other owing to the force which each exerts. As the hand moves into higher or lower positions on the fingerboard the muscles of the wrist and of the fore-arm come more into play. Turn we now to the right arm. Here the sweep of the bow requires the muscles of the upper arm as well as those of the lower arm and wrist. The rapidity with which the bow has to pass from string to string and the unerring manner in which a first-rate performer will do this without the slightest fear that a wrong string is touched, either by itself or in combination with the correct string, display a muscular dexterity, a balancing of the forces of numerous flexor and extensor muscles, which is simply marvellous. All the complicated processes which have been mentioned are the result of the intelligent direction of the mind communicated through the efferent nerves. The phrasing and expression employed by the performer will receive the earnest attention of the listener, who must try to realise that whatever emotion is raised by an artistic performance, the actual means employed can be reduced to certain purely mechanical acts. Thus any note may be made louder or softer, slower or quicker, and all expression, however apparently spontaneous, can be summed up in these details. Besides the details given above, the performer, through the afferent nerves is listening to his own performance and continually revising his work, so that little imperfections may



be detected and remedied. What has been said with regard to the violin applies to any other solo instrument, due regard being had to the differences of idiom and the peculiar characteristics of the instrument. For instance, a violinist is responsible for his performance being in tune, and he has to watch most vigilantly for this purpose. On the piano all this responsibility is assumed by the tuner. It is a direct consequence of this that a sense of absolute pitch is more frequent amongst violinists than pianists. The violinist, as a rule, never forgets his A, and when he is an orchestral player this note varies in pitch very little indeed, so that his memory of the note, and consequently of other notes, is very clear and firm. The teacher, who is supposed to have gone through the analytical processes just described, will utilise his observations in his own work. He will find that the qualities which go to make up the first-rate performer are also those which his pupils must aim for. Even from the very first lesson this fact must be always kept in view. Yet it is a fact that in a great many cases children are not expected to play with any style or taste, and consequently their performances are not of interest either to themselves or to anybody else.

Let us for a short space consider the work of a great conductor. It is, perhaps, too much to assume that he can detect the tone of any particular instrument in a mass of violins, but short of that he can associate any particular note with a certain orchestral player, and this again is co-ordinated with a particular place in the orchestra. This gives him that command over his orchestral forces which he must have to obtain a satisfactory performance. If his memory is equal to the strain of acquiring a perfect knowledge of the full score of the music he is conducting, his command over the players is still greater. Let it not be supposed that the frantic gesticulations employed by many a conductor, or the wild tossings of his dishevelled hair are an evidence of his skill. If he succeeds it is in spite of these displays. His work was done at the rehearsal, and if it was efficiently done only quiet and dignified motions are required at the actual performance. A moment's consideration



will show that the qualities which go to make up a successful conductor of a large orchestra are exactly those which the choirmaster of an ordinary church or chapel choir should possess. Even in the still more humble sphere represented by a teacher guiding the early steps of a young child at the piano we have a representation of the conductor, but on a small scale. The qualities required to impel a child to play her piece accurately and with taste are exactly those of the great conductor.

Having observed for a short time the various kinds of musical performances, it will be necessary to ask ourselves the question—How can we discover the means by which their details may be classified psychologically? We observe in the case of the performer that there are certain movements of the muscles by which sounds are evolved from the instrument. What originates these movements? The intelligent direction of the mind. In the case of the average performer we know that the actuating cause is, primarily, a number of symbols which go to make up a sheet of music. These symbols pass through the eye and are apprehended by the mind, which in turn originates the muscular movements previously mentioned. In the case of the expert public performer the sheet of music to which allusion has been made is not present, but its contents have been previously mastered so thoroughly that they have left behind them a perfect mental picture. The part played by the conductor, teacher, or choirmaster includes the same elements, but regarded from another standpoint. Here we have an impelling force which causes the performer, vocal or instrumental, to do certain work. The task of the teacher or conductor is so to guide the mind and the muscles of the pupil or performer that the results previously described may be attained. Obviously the mind is the central organ to which we must gain access through the senses. This is the task which every teacher should place before himself, and it applies to all his pupils, due allowance being made for difference of age and consequent differences in the matter of mental development. Inattention to this condition is one of the most frequent causes of inefficient teaching.

Alexander Bain tells us, in his autobiography, that he made a

profound study of Shakespeare when he was engaged in writing his two monumental works, "The Senses and the Intellect," "The Emotions and the Will." He does not explain why he adopted this course, but it is obvious that he desired a truthful and natural display of human feelings and emotions, and he considered that Shakespeare fulfilled those conditions. What an interesting book Professor Bain would have produced if he had published his researches in Shakespeare's plays! That would have been an appropriate Analytical Outline to precede his celebrated Synthetical Compendium. Although it may be perfectly true that no two human beings are exactly alike, either mentally or physically, it is quite certain that the actions of all are governed by the same laws. This is clearly implied in Professor Bain's use of Shakespeare. Another excellent example of this will be found in Ruskin's "Ethics of the Dust," which consists of a series of lessons given to a class of girls. The lessons were imaginary, of course, but they serve to show that Ruskin had deeply studied the dispositions of girls. Any teacher who has been in the habit of meeting classes of girls in middle-class schools will say: "Why, I have met with these girls under other names over and over again." And what delightful girls Ruskin brings before us. Anyone who has ever read "Ethics of the Dust" must always be glad to renew his acquaintance with Egypt, so called from her dark eyes; and Sibyl, so called because she knows Latin; Jessie, who somehow always makes the room look brighter when she is in it; Mary, of whom everybody is in great awe; as well as the younger members of this delightful class. There is only one detail in which Ruskin is in error—he represents the girls as asking questions quite easily. It is the writer's experience that nothing is more difficult than to induce girls to ask questions in class. They wish to do so, of course, but they "don't like." During a very long career he has not known more than half-a-dozen girls who asked questions because they could not help doing so. The difficulty rose in the mind and they instantly propounded the appropriate question instead of brooding over it.

Although our dispositions and intelligence vary in every possible way, it is no less true that we are very much alike in many ways. What one person does will be repeated, under similar circumstances, by nineteen out of twenty others taken promiscuously. This is, of course, true in the case of those who are slaves to fashion, and who will adopt any device in dress if this is regarded as being the "correct thing." But the above assertion refers equally to the performances of pupils. If a teacher is in the habit of using a particular book of Studies, he can, on turning to any page, point out the places where the next pupil who takes that particular page will go wrong. That this assertion is not a reflection on a particular teacher, or class of teachers, is obvious from the fact that it is deduced from a long experience of large boarding schools for girls. Here the pupils come from all parts of the country where they have been instructed by all kinds of teachers. Yet the result is almost invariably the same. In teaching Raff's "Abends," not a particularly difficult piece, the writer has frequently said, pointing to the middle part of the piece, "You will make at least eight mistakes before you reach the change of signature. I will count them to myself as you play and then point them out to you." The girl may possibly ask, "Do you know which mistakes I shall make?" To which the reply is "Yes." Incidentally it may be mentioned that a challenge of this kind is a good way of stimulating "attention." What has been said with respect to Raff's "Abends" applies equally to other pieces. A discussion as to various kinds of errors and their correction will be found in a future chapter.

The observation of phenomena such as have been described, forms, so far as the music teacher is concerned, the basis of his investigations in psychology. We have on the one hand a certain performance, correct or the reverse, of voice or instrument. This performance is the result of certain mental promptings. It is the connection of these two things that brings them within the ken of psychology. Herbert Spencer is very clear on this point. He says that each of the propositions of psychology "takes account both of the connected internal



phenomena and of the connected external phenomena to which they refer." So far as the teacher is concerned this description of the purposes for which psychology can be used is amply sufficient. That is to say, we observe certain of the phenomena of the outer world and classify these phenomena in our minds. Some writers give a large amount of attention to what they call introspection. They assume that by this means they can attain to results which cannot be attained in any other way. It is quite true that we can investigate our own internal mental processes without reference to external phenomena. But such a process must be influenced in a large majority of cases by previous external phenomena, in other words "introspection is retrospection." For a man to assert that he is not thinking of external phenomena is actually a proof that he is thinking of them. The mere effort to turn the thoughts inwards implies the outer world. Sir Arthur Helps, in his "Friends in Council," gives us the *reductio ad absurdum* to the introspection device when he describes to us how the German philosopher shuts himself in his room, and after a considerable amount of silent cogitation, doubtless accompanied by an unlimited amount of tobacco smoke, evolves a description of the camel from his inner consciousness. Whatever services introspection has given to psychology these are of little or no value to the music teacher. If then we exclude introspection from our consideration we may appropriately define psychology as the science which observes and classifies the phenomena of consciousness.

In the chapters which follow we shall have first those data which have to do with the objects existing in the outer world and the manner in which our knowledge of them is obtained. This in itself, according to Herbert Spencer, is not psychology, but includes data which are absolutely necessary for an orderly building up of that science. After that we shall consider in what manner the mind treats the knowledge so obtained. What follows will be found amply sufficient for the purposes of the music teacher. The principles involved in the science of psychology are clearly set out, and they are illustrated by an ample number of examples. These examples can be amplified



by the teacher to any extent, but it will be found that no new principles are involved however great a mass of detail is accumulated. As this book is primarily intended for teachers of music, the illustrations of various laws and principles are drawn from the daily work of such teachers. This will be found advantageous in several ways. The connection between the principles evolved and the illustrations quoted is more easily seen when the illustrations are thoroughly familiar to the student. All thoughtful teachers of music will, at one time or another, have meditated upon such cases, and it is hoped that this book will help them to throw their thoughts into systematic form. They will be able to try experiments founded on the principles evolved in the succeeding chapters of the book. They can take the facts stated with relation to the teacher's work, and then modify them in such a way as will be suitable to their own pupils. Every musical illustration given in this book is drawn from the life-long experience of a teacher who has had ample opportunities for observing the kinds of work done by his contemporaries. These are, of course, good, bad, and indifferent, but they have served to guide the writer in forming the conclusions on which this book is founded. Although, as was remarked above, there are many thoughtful teachers who have formulated plans which have helped them to do their work efficiently, these individual exertions represent what, under a properly regulated system of education, must be regarded as an unnecessary expenditure of labour. Of course successful teaching must imply some observation of the laws of psychology, even though this be unconsciously done. An example will show this. A lady who was known to the writer was most successful as a teacher of the piano. Her pupils were almost invariably good sight-readers, and they played with taste. Parenthetically it may be remarked that sight-reading is usually a weak point with both teachers and pupils. The Principal of the school in which this lady was employed consulted with the present writer as to her abilities as a teacher. It was agreed that her teaching violated every canon which is recognised in this enlightened age. Instead of patiently

leading her pupils forward she drove them on by storming at them, stamping her feet as if she was working a sewing-machine, and possibly giving an occasional thump to the poor unfortunate girl. At the same time she fiercely played the melody of the piece which was being learned near the top of the piano. All educationists will be shocked by such a picture as this. Yet she was the most successful lady teacher whom the writer ever knew. Hence it cannot be denied that, in some way or other, the laws of psychology were observed, or perhaps it is better to say fulfilled. The solution of the problem is found in the fact that her methods compelled "attention," and not only so, but attention at a particular instant. In this way the advantages gained were on a par with those which result from the persistent performance of concerted music, or accurate practice with a clock-work metronome. Both these plans, if conscientiously pursued, result, on the one hand, in mental alertness, and on the other in prompt and accurate muscular adjustment. What has just been stated also applies to keyboard instruments which produce clicks instead of musical sounds.

The terminology employed in the following chapters is drawn from the works of the best modern writers on psychology. In all cases where there was any opportunity for discrimination between different terms, that which was most concise, if it was at the same time clear, was invariably selected. Disputes over mere terminology have always appeared to the present writer rather childish proceedings. Yet there have been plenty of examples, both in mental and in physical science, in which what has been regarded as a brand-new discovery has been hailed with great acclamation when a little further investigation has shown that we have been observing an old friend, but clad in new verbal garments. For instance, when Kant speaks of "the manifold in intuition" he describes what we know as a "concept." It is thoroughly characteristic of Herbert Spencer that, with so clear and accurate a technical term as this he should prefer this long and tortuous circumlocution.

"What we call knowing the object is the assimilation of this combined group of real feelings it excites, with one or more preceding

ideal groups which objects of the same kind once excited ; and the knowledge is clear only when the series of ideal groups is long. Equally does this principle hold of the connexions, static and dynamic, between each such special cluster and the special clusters generated by other objects. Knowledge of the powers and habits of things, dead or living, is constituted by assimilating the more or less complex relations exhibited by their actions in space and time with other such complex relations. If we cannot so assimilate them, or parts of them, we have no knowledge of their actions." (*Principles of Psychology*, vol. 1, p. 186).

This long and complicated statement is exactly equivalent to the definition of a "concept" which will be found in Chapter III.

## CHAPTER II.

### THE SENSES.

THE whole of the phenomena which we shall have to discuss are divided into two portions, called respectively "objective" and "subjective," and these have to do with "matter" and "mind." The term objective refers to everything which is exterior to the mind of any particular observer, whilst the impressions of any of these objects conveyed to the mind are said to be subjective. Roughly speaking, the exterior world is said to be objective, but this by no means exhausts what may be enumerated under that head. For instance, atmospheric vibrations, in the form of alternate compressions and dilatations of the air, are, as we know, the cause of what we call sound. These vibrations, as they pass into the internal ear, must still be regarded as objective, and not until they have been received into the mind, where, by means of the auditory nerve, they are transmuted into a sound, do they become subjective. It is curious to consider that there would be no such thing as a sound in the world if there were no sentient minds to receive the atmospheric vibrations which are described in books on Acoustics. In the same way the rapid undulations of the luminiferous ether are objective as they pass through the lens of the eye, and also when they impinge on the retina. It is only when the sensation of light is impressed upon the mind that it becomes subjective. It is therefore scarcely a paradox to say that if human beings had no eyes there would, so far as we are concerned, be no such thing as light. Considerations such as these have caused some metaphysicians to question whether we have any satisfactory evidence for the existence of an outer world, and whether everything which we see, hear, taste, smell, or feel is not simply the effect of our imagination.



Some have gone so far as to say that Bishop Berkeley denied the existence of matter, and amongst these were leading members of the Scottish School of Metaphysicians. For instance, Dr. Brown, who was Professor of Moral Philosophy in the University of Edinburgh in the early part of last century, jests ponderously on the subject. When Berkeley visited the noted French philosopher, Malebranche, in Paris, they had a vehement discussion on our knowledge of the outer world, on which they held similar views. As Malebranche was in a feeble state of health at the time, this discussion was said to have hastened his death. On this circumstance Dr. Brown comments as follows:

“When we consider this interview of two illustrious men, each of whom, in accordance with his own system, must have been incapable of any direct knowledge of the existence of the other, the violent reciprocal action of these mutual nonentities might seem ludicrous, if there were not, in the death of any one, and especially of a philosopher so estimable in every respect as the author of ‘The Search of Truth,’ something too serious to be consistent with any feeling of levity.”—Dr. Brown’s Lectures on the “Philosophy of the Human Mind,” 1826, p. 152.

It was very much to the discredit of the Scottish philosophers that they either could not, or would not try to understand Berkeley’s propositions. It is said that Dean Swift caused the Bishop to wait in a pouring rain outside his door on the ground that if there was no such thing as matter he could not become wet through, or that if he did he would take no harm. Therefore the Dean’s servants were forbidden to open the door to the Bishop. Lord Byron jestingly refers to the common notion of Berkeley’s theory in the lines—

“When Berkeley said there was no matter,  
It was no matter what he said.”

Those readers who wish thoroughly to study the evidence for the existence of an exterior world are referred to more elaborate books than the present. The subject is treated voluminously by many authors, in fact it appears to be a point of honour with writers on the subject to vanquish the difficulties involved in proving the existence of an outer world. The most satisfactory

attempts to solve this problem known to the present writer are those by Kant and J. S. Mill. In this book we will assume the existence of an outer world without advancing any proofs.

The brain is, amongst other things, the organ of the mind, and hence calls for some attention from us before entering upon the functions of the senses. Although much remains uncertain with respect to the manner in which the brain does its work, the perseverance of investigators, especially within the last few years, has produced some very interesting and striking results. Any elaborate description of these would be out of place in a book like this. Readers who are interested in this subject are referred to a very excellent article, "Brain," in Chambers's *Encyclopædia*, which gives the most recent views upon this subject by one of its foremost exponents. The brain is composed of two substances known as the gray matter and the white matter. The gray matter forms nerve cells, whilst the white matter consists of nerve fibres by which nervous impulses are transmitted to and from the cells with which they are connected. Information which has reference to all kinds of phenomena is conveyed to the brain by the "sensory," also called the "afferent" nerves, whilst instructions to perform various actions are conveyed through the "motor," also called the "efferent" nerves. The positions of many of these nerves have been determined, but the area within the brain which corresponds with any particular sense, such as hearing or sight, and by which it is apprehended by the mind, has not been satisfactorily determined. Still less conclusive is any statement as to the operations of the brain when the powers of the intellect are exercised. It is believed that the frontal lobes of the brain are concerned when our intellectual powers are employed. Yet there are arm-chair scientists, who probably never saw an experiment, who will glibly decide the whole matter in a few minutes. They will tell us that two adjoining nerve cells have intellectually much in common. Also that nerve cells which are only indirectly connected by means of nerve fibres are, in a corresponding degree, at a considerable distance from each other so far as their intellectual functions are concerned. This may

be true, of course, and, in fact, seems very likely. But reasoning in that *à priori* manner which a real scientist would never dream of using they go on to explain that the more intimate connection of these widely separated cells is the chief function of education. Also that this is done by the creation of new nerve tracks in the brain which shall act as short-cuts from one nerve cell to another. Whether these pseudo-scientists mean that such an elaborate tramway system is an actual matter of fact or is simply a figure of speech must be left to the exponents for explanation. It is of little or no importance for the purposes of this book whether such nerve tracks have an actual existence or not. Those readers who find that such a plan enables them to picture out with greater facility some of the mental processes which will engage our attention are at liberty to use it, but they must be careful not to regard the theory as having a physical basis. The tendency to theorise, either on insufficient data or on *à priori* notions, is always an indication of a want of scientific training.

All the phenomena of consciousness are conveyed to the brain through the senses. So much is obvious from what is stated above. Of these senses we may, in this book, disregard "taste" and "smell," as they have no connection with musical performances. The word taste is employed in a secondary sense to express our feelings with respect to certain kinds of music.

As this book has to do with music it is appropriate that the first of the senses to engage our attention shall be "hearing." Certain movements called vibrations are set up in objects more or less distant from the observer. These vibrations are caused by the agitation of the object by mechanical or other means. They are then transmitted through an elastic medium, generally the atmosphere, until they reach the aperture of the external ear. They pass into the ear, where they encounter a membrane which bounds the middle ear or tympanum—the so-called drum of the ear. This membrane, in its turn, receives the waves of sound from the outer ear and vibrates synchronously with them. From the tympanum the vibrations are transmitted through a



chain of small bones, respectively called the hammer, anvil, and stirrup bones, until the internal ear, or labyrinth, is reached. The bone which is then encountered has two apertures both closed with membranes, one oval, the other round. The last of the chain of bones in the tympanum, the stirrup bone, presses against the membrane of the oval aperture and so transmits the vibrations to the labyrinth. Here they are carried forward until they reach the auditory nerve, when they are transmuted into sounds. It is believed that a series of fibres, called the organ of Corti, receive the vibrations, each fibre vibrating in sympathy with certain notes, and that these vibrations as they enter the brain become what we call sounds. It must be understood that much that has just been written is very speculative in character, and that further investigations may seriously modify what is stated. Also that any detailed description of the internal ear is almost impossible without the aid of diagrams, and under any circumstances is of little or no importance in a book of this kind. Still, we are quite sure of the general phenomena. Vibrations enter the ear, and somewhere or other they are transmuted into sounds. It is of course quite immaterial where the change takes place, so far as the main purpose of this book is concerned, but we know that this point marks the change from objective to subjective. Sound vibrations may be transmitted through any elastic body, as was stated before, and this is usually the atmosphere. Many experiments have been devised to show the manner in which vibrations are transmitted through metals, wood, and other media, and one such experiment may well find a place here, since it may easily be repeated by most musicians. If a tuning-fork be set in vibration and its stalk pressed on a suitable soundboard, the fundamental note of the fork is transmitted to the ear in the usual way, that is, by atmospheric vibrations. But if the stalk of the tuning-fork is pressed against the upper teeth by far the larger portion of the vibrations are transmitted through the bones of the head to the inner ear without the intervention of the atmosphere.

If the operations which go to the transmission of sound-



vibrations to the mind are marvellous, not less so are these vibrations if we examine them from the point of origin. If a note is sounded on the violin, we have, besides this fundamental note several notes of higher pitch called overtones. The rich tone of the violin is a direct consequence of the presence of these overtones, although we are not conscious of their existence as separate notes. Now let a second violin sound a note a major 6th lower than that given by the first violin. Again we shall have a series of overtones similar to those previously described. But let both instruments give their notes at the same time, and the result is more complicated than that implied by the addition of their overtones and fundamental notes. The two fundamental notes will generate another note called a differential tone, which is a 5th below the lower of the actually sounding notes, and the various pairs of overtones will evolve their own differential tones. The fundamental notes will also generate what is known as a summation tone, in this case a minor 6th above the higher of the two sounding notes, and there will be other summation tones due to the overtones. Let us suppose that each instrument produced nine overtones besides its fundamental note, then an easy calculation will show us that there will be at least 40 distinct notes sounding. Each of these notes will have its own system of vibrations which will be transmitted through the atmosphere as if no others were present. If we look down on the surface of a lake when it has been very slightly ruffled by the wind, say standing on Friar's Crag and looking down on Derwentwater, we shall see countless waves intermingled in the most complex manner, and yet each maintaining its separate existence. The same phenomenon can be observed whilst looking down on the sea on a calm day. We marvel at so great a complexity in the case of waves of water, but that of sound waves must be much greater. Let us now, in imagination, add to the two violins a viola and a 'cello, thus making up the usual string quartet. The number of distinct series of sound waves is very much increased, but no useful purpose would be gained by any attempt to estimate their number. Still more marvellous is the fact that a section of these onward moving sound waves

of less than an inch in diameter, containing all these diverse elements, passes into the ear, and all the consequent sounds are reproduced in the mind, and with due regard to their relative force.

The sense of "seeing" is, in many ways, analogous with that of hearing, and hence the minute detail which was employed in describing the phenomena of the latter is not necessary for the former. Waves of light are not transmitted by means of the atmosphere, but by an infinitely more rarified medium which is called the luminiferous ether. Whilst the atmosphere extends to a few miles above the earth's surface, the luminiferous ether extends throughout the whole of space. Waves of light, whether initiated by the furthest star, or by a candle burning in the same room, transmit their vibrations through the ether to the lens which forms part of the eyeball. The lens of the eye is formed of three portions called humours. These are called, counting from the front of the eyeball, the aqueous humour, the crystalline lens, and the vitreous humour. They are enclosed in a covering which is opaque for the most part, and is called the sclerotic, but which is transparent at the front of the eye, and there is called the cornea. The light waves pass through the media just described and are refracted, as in the case of ordinary lenses, according to the laws set out in books on Optics. It is unnecessary to enter into details as to these laws.

Every object which is said to be visible gives rise to waves of light such as have just been described. Some of these objects are self-luminous, such as the sun, a fixed star, an electric light, or the phosphorescence seen in decaying fish. Other objects cannot be seen without the aid of borrowed light, such as the moon, a planet, and nearly all the natural objects on the earth's surface. The different objects which are visible have many different colours and shades of colour. Every one of these differences is represented by light-waves of varying rates of vibration. Hence if we look down at a garden when its flowers are in bloom we know that from each of these one or more series of light-waves passes to the eye. In the case of a flower

with variegated petals it would be a difficult task to sum up the number of light-waves of different length which are necessary for an accurate picture of this flower. Yet the whole of these light-waves pass through the lens of the eye absolutely without interfering with each other. At the back of the eyeball is the retina on which an image of the object previously referred to is thrown. So far the object of vision is, with relation to the observer, in its objective state, but now, by means of the optic nerve, the image is conveyed to the mind and becomes subjective. It is a curious fact that any object whose image passes through the lens of the eye appears on the retina in an inverted position, yet we are unconscious of the fact.

The senses which have been described are, in each case, confined to a very small portion of the body, or, to be more precise, they are located exclusively in the head. Another peculiarity is that they can be acted upon by objects which are at a greater or less distance from the organ of sense. In the sense of "touch" all these conditions are altered. This sense is diffused over the whole of the surface of the body, the interior of the mouth and nostrils, and the tongue, and it can only be exercised by objects with which they are in contact. Some parts of the body are much more sensitive to touch than others, but any details in this respect are not of importance here. Parenthetically it may be remarked that both sight and sound may be classed along with touch, because the vibrations which are necessary do actually touch the organ of sense in each case. A little consideration will show that waves of heat stand in the same category, but that they may impinge on any part of the body instead of one or two special places like light and sound.

In musical performances the act of touch with respect to a very small portion of the body need be considered. The tips of the fingers chiefly require our attention in performances on keyed instruments. Touch may be regarded from two stand-points. There is the actual pressing of the note, and there is, in many cases, a movement to follow which is suggested by this touch. Thus in scale playing the pressing of one finger suggests the next. This can be effected so quickly that the



mind is scarcely conscious of such an impulse, and it is hence called "secondarily automatic" by some writers. It is not a matter of importance to us whether the brain is actively employed in each movement, or whether some more economical plan is adopted. The employment of touch in finding the requisite positions on the keyboard is, of course, very obvious in the case of performers who are afflicted with blindness, but a little observation will show that their more fortunate brethren also employ this device more frequently than might at first be suspected. To find notes by means of sight is frequently a very great hindrance to expert playing. The tips of the fingers are chiefly employed, but also other parts of the hand. Momentary contact with one of the black notes is very useful, especially when the groups of black notes can be discriminated by the wider spaces between these groups. When crossing the hands their prominent parts, such as the outer part of the palm, the knuckles, and the like are almost sure to touch, if ever so slightly, and these faint tactual impressions may be made very useful by the attentive student. What has been said with respect to the piano applies equally to the organ, but in the organ we also have the pedals. Here the pressure of the feet on the pedals is analogous to what was said with regard to the tips of the fingers. When the feet pass over or under each other in scale or arpeggio playing, they touch each other momentarily in passing from one position to another, and this conduces to accuracy. Skilful and artistic use of the pedals in pianoforte playing demands a more sensitive touch than is usually considered necessary. When playing rapid and brilliant passages on the piano, more assistance is gained by the pressure of the feet on the ground than might at first have been suspected. This can be demonstrated in the case of a performer who has sustained a slight injury to the knee or other part of the leg. Each slight movement of the body is accompanied by a momentary sensation of pain in the injured part which can only be due to the involuntary pressure of the feet on the ground. A circumstance of the kind described above was the means by which the present writer discovered this phenomenon. With instruments of



the harmonium class the wind is supplied by the action of the feet. To perform this operation accurately and neatly the touch of the feet needs to be very sensitive, and this is especially the case when the expression stop is used. Much that has been already said applies to the tips of the fingers as employed on all kinds of instruments, and so will not require to be repeated, but there are some additional details which must be briefly noticed. On the violin and other instruments of this type the thumb and the root of the forefinger of the left hand must have a very sensitive touch to enable the performer accurately to reach the higher "positions" on the instrument, and as the body of the instrument is reached assistance is gained from the palm of the hand pressing against it. Expert performers who have not realised this would be astonished if they should attempt to analyse their movements and to identify the parts of the hand which touch the neck of the violin for a longer or shorter time. The right hand, which holds the bow, requires to have a very sensitive touch in all the fingers and the thumb. Every change in the position of the bow demands a slight change in the pressure of the fingers, either in direction or in position. Wind instruments require the most accurate adjustment of the lips, called the *embouchure*, and this is very largely the result of touch. "They say" that a flautist who employs a faulty *embouchure* at first can never have it remedied. Amongst the most sensitive parts of the body are the lips and the tongue. They are used when playing wind instruments, the lips for tone production and the tongue for distinct articulation. The clear performance of repeated notes on the cornet is effected by the articulation of syllables, such as "tu, ku," which demand an alteration in the position of the tongue. The same remark applies to other wind instruments. In singing also the sensitive touch of the lips and the tongue should be of the greatest service for a really artistic performance. It is impossible to exaggerate the minuteness and delicacy of the touches of these organs which are required for the clear articulation of the words and their intellectual connection. Listeners who have had inflicted upon them the performance of singers whose language cannot be identified will appreciate this statement.

The only sense remaining to be described is that which is known as the "muscular sense." The discovery of the muscular sense is due to Dr. Brown, who was Professor of Moral Philosophy in Edinburgh University, and it has been of the greatest value for the explanation of many psychological phenomena. It is, in fact, one of the most important discoveries which have been made in this science since the time of Kant. If we lift a heavy body certain muscles contract, and there is a sense of strain. This is due to the impression conveyed to the brain through the afferent nerves. If we practise a study on the piano at a high rate of speed for a longer or shorter time, there is a feeling of fatigue which is due to the muscular sense. The same remark applies to the bow arm of the violinist. These examples of the exercise of the muscular sense are quite obvious, but in the majority of cases the impression on the mind is so slight that it would never make itself felt as a separate sensation. An expert performer on the piano, when reading at sight, does not allow the names of the notes which he is playing to rise into consciousness in the mind. Notwithstanding this, he finds these notes with the greatest ease, owing to various devices which result from his wide and varied experience. The nature of these devices will be found fully discussed in the succeeding chapters, but one such device may well receive our attention here, because it serves to illustrate the employment of the muscular sense. A note which is at least six ledger lines above the treble or below the bass is isolated from any other notes of nearly the same pitch, but closer to the stave. What must be done? To count up or down the other ledger lines is much too slow a device, and besides it would be most undignified in the case of an expert performer. The hand moves almost unerringly to the right note owing to a rapid and almost unconscious estimate of the distance. This estimate is chiefly due to muscular impressions connected with the eye which are conveyed to the brain through the muscular sense. The eyeballs turn upwards or downwards to a greater or less extent, and the exact amount required is shown by the movement of the muscles by which they are actuated. The impressions thus conveyed to the mind lead to muscular

movements of the hand and arm through the action of the efferent nerves. It is worth noticing that difficulties which occurred in trying to explain some of the phenomena of vision were what led to the discovery of the "muscular sense."

The student will see that the muscular sense is intimately connected with those which have gone before. This is especially the case with the sense of touch. For instance, the *embouchure* of wind instruments requires the most accurate adjustment of the muscles of the lips, and this is correlated with the impressions of touch which have been previously noticed. The management of the breath is also a good illustration of the muscular sense. What has just been stated can also be employed in relation to vocal performances. The acquisition of what is called *technique* on the piano is very largely a question of muscular movements. The nice adjustment of these movements depends upon the impressions in the mind of the muscular sense, and the consequent directions for their revision. It is, therefore, obvious that any laxity in the mental vigilance which should accompany all forms of study is fatal to the effective practice of such things as five-finger exercises or scales, &c. Yet we find that children are frequently kept to technical practice for a much longer time than their immature minds can use effectively.

We have now passed in review the various "senses" which are concerned in our musical performances, and the manner in which the impressions of the outer world are transmitted through these senses to the brain. Our next task will be to see in what manner these impressions from the outer world are transmuted into thought and intelligence. From what was said on p. 8 it is obvious that the chapter now approaching completion, added to that upon which we shall immediately enter, gives us the whole of the data which belong to psychology.



## CHAPTER III.

### THE MIND.

WE have seen, in the previous chapter, that all information with respect to the outer world is conveyed to the mind through the senses and by means of certain very fine cords called the nerves of sensation, or, more frequently, the afferent nerves. To be more precise, these nerves are continued until they reach the brain, where they influence certain of the brain-cells, and, in some mysterious way, this is transmuted into actual knowledge. Much thought has been given to this subject by many acute and observant philosophers, with the result that a certain amount of positive knowledge has been gained by means of slow and painstaking perseverance. Progress in this direction can never be rapid, because anything like a direct experiment is impossible. Such experiments have been made on animals with very interesting results, but only an autocrat like the Shah of Persia could order similar experiments on human beings. Hence we have to wait until nature, owing to something abnormal in a human brain, presents us with a suitable experiment. Much information has also been gained by the observation of persons afflicted with blindness who have afterwards had their sight restored. The mental impressions of such patients, on observing objects before they have gained any experience with the newly-acquired faculty, are most interesting and instructive. Yet there have been persons who have thought that they could, by means of the pseudo-science of Phrenology, map out the human brain in the most complete manner. The very rapidity with which this was done sufficed to condemn Phrenology in the eyes of any of those who know what true



scientific investigation means. Not until every apparent source of error has been eliminated does the scientist allow himself to draw a conclusion, and he will wait for this certainty for years. The most striking feature in "The Origin of Species" and "The Descent of Man" is Darwin's reluctance to draw a conclusion. On the contrary, many a voice-trainer thinks he has observed a certain fact, and on this he builds a superstructure of theory as tall as the tower of Babel and almost as useless. Hence the large numbers of systems of so-called voice production.

As was said in the preceding chapter, the impressions of sense conveyed to the brain are said to be "subjective." A single subjective impression, however simple or complex its character, is called a "percept." During the first few weeks of life a child's education is exclusively confined to an accumulation of very simple percepts, and under no circumstances are these percepts correlated. For instance, if a sheet of music is held up in view of the child there is a simple impression due to the whiteness of the paper. This then is obviously a percept. A little later the child would try to convey the paper to its mouth—obviously an additional percept. In a few years that sheet of music represents a good many percepts to the little girl or boy who has to spend a few hours in mastering its contents. In the hands of a good teacher these percepts would be correlated by suitable appeals to the pupil's intelligence, but in far too many cases this is not attempted. In such cases the page presents what Professor Sully calls a "train of symbols" to the eye of the pupil, but there is no attempt to connect these symbols by the Law of Contiguity or by any other means. If the music represented by that sheet of paper is played to the very young child we again have a greater or less number of single percepts, but we have no reason to believe that these notes represent what we call a tune in the child's mind. The pleasure and interest which the child shows in listening to the music is by no means intellectual, but purely sensual. It is to be feared that many grown-up persons have advanced a very few steps from this rudimentary condition. How soon the separate percepts begin to be co-ordinated will depend in part

on heredity and also on environment. The child of musical parents who hears a good deal of music is more likely to develop this faculty at an early period than those children who have not such advantages. The sense of touch is very rudimentary in very young children. If such a child's foot is touched, that excites a simple percept in the child's mind, because it knows of no ownership to that foot. By-and-by this additional percept is correlated with the other. If any object is laid on the baby's palm there is an immediate contraction of the fingers, but this movement is automatic, and does not imply the correlation of two or more percepts. Any automatic act such as that just described is said to be due to "reflex action" of the nerves at the point of contact. Many such reflex acts are described in works of psychology.

On p. 19 it is stated that the pressure of the tip of a finger on the piano in rapid scale playing suggests the movement of the following finger in each case. This is an example of reflex action which is acquired as the result of much practice on the instrument. Because the action of the mind is not very apparent in all the details of such skilful scale playing it is assumed by some writers that the work is done automatically. This view is certainly not shared by the present writer.

We have seen that all the beginnings of knowledge are what we call percepts, that is to say, single impressions conveyed to the brain through the nerves. Very soon the child's intellect begins to compare and to associate these percepts in groups, at first small and afterwards larger. This grouping of percepts leads to the formation of "concepts." A concept, then, is an idea expressed in a word or a phrase which may be employed to describe all the individuals of any group of percepts. This gives rise to what is known as a "conceptual image" in the mind, by which these individuals may be identified. Any object forming a percept may be referred to one or another concept according to circumstances. Examples of various "classes" to which a given percept is assigned will be found later in the chapter. All our knowledge consists of the concepts which we have accumulated. The difference between the greatest dunce and one of our most

learned scholars is simply that one has the skill to accumulate a large number of complicated concepts, and that the other is devoid of this power. If the sheet of music previously spoken of is shown to a child of about twelve months old, we should see evidences of a very rudimentary concept. The shapes printed on the paper would now receive the attention of the child, who would regard them as pictures, and would classify them with what had been observed in other books. Perhaps "classify" is too imposing a word for so rudimentary an operation, but it is the same in kind, if not in complexity, with that of the trained thinker. When the music was performed the child would hum or murmur in imitation, probably not in tune, but that would come later. If the child had heard much music, vocal or instrumental, this humming or murmuring would display another rudimentary concept. Later on the sounds produced would be correlated with their symbols, and hence the concept would become more complex. Further illustrations are unnecessary, but it may be useful to give one actual example of the

### GROWTH OF A CONCEPT.

The circumstance to be narrated occurred in a very small town a little over half-a-century ago. In a cosy sitting-room a young lady and a very small boy were having tea. The young lady had just finished her education at a boarding-school and had invited a neighbour's child to have tea with her. This was an early example of that kindness of heart and graciousness for which in after years the lady in question became noted in the town in which she lived. She was in sympathy with every good work, which she helped on with both money and personal assistance. She explained to the small boy that she had just finished her schooling and that her father had bought her a new piano. Such an instrument was a great rarity in any out-of-the-way place such as the small town in which this circumstance occurred, and it is quite certain that the small boy had never seen such an instrument before. The piano stood as usual at one side of the room. The instrument would make a single



impression on the boy's mind, and hence at this stage it was a simple percept. If he could have observed whether the case was made of rosewood or mahogany, or that it was ornamented with fluted silk, as it probably was, the correlation of these observations would have given rise to a more complicated percept. However, it is most unlikely that a very young boy could be so observant as that, especially when the piano was pointed out to him so unexpectedly. Also the room would be dimly lighted by means of a couple of candles, as gas was unknown in that small town. The young lady said, "What would you like me to play to you?" and enumerated several pieces of music. The little boy said "A polka," that being the only title which he could catch. After playing the polka she gave several other pieces. Shortly afterwards she was called out of the room, when that little boy stole up to the piano and pressed down a key, but so gently that no sound ensued. Observe the rapidity with which the percept increases in complexity, for it now includes all the senses described in the previous chapter—sight, sound, touch, and muscular force. Such was the present writer's introduction to the piano. Until this piano had been mentally compared with others the instrument remained in the boy's mind as a percept, but opportunities for comparison would soon convert this into a concept. There would, on the occasion just described, be evidence of one or two very partial concepts. For instance, the music which was performed would be unconsciously compared with that previously heard at school and at home. It is safe to assume that a good many things have been added to the concept of a piano since that time.

From what has been said it is easy to infer that the art of the successful teacher lies in the careful selection of percepts, the manner in which they are imparted to the pupil, and their correlation with the knowledge which has been previously acquired. To do this effectually due consideration must be given to the pupil's age and previous mental training. For instance, the reasoning powers of very young children are of a low order, whilst their power for memorising is correspondingly high. Their mental adhesiveness is so strong that they

can with very little trouble enumerate in correct order a series of things which in their minds have not the slightest logical connection. They have not the slightest difficulty, in many cases, in enumerating, in proper order, the names of the kings and queens of England. The only guide they can have is the successive sounds, of which one will suggest the next. If we had to try to learn the order of the kings and queens of England we could only succeed by our reasoning powers being exercised on the history of England. What has just been said applies with still greater force to the acquirement of the multiplication table. It is possible of course to demonstrate every assertion contained in that table, but in the child's case this would not be done, except very partially in the kindergarten. The sole guide to a practical use of the multiplication table is the association of the successive sounds of the numbers multiplied together with their product. The pronunciation and connection of the first two will unerringly call up the other. This statement any reader can easily verify by one or two experiments. Obviously then the strong mental adhesiveness of a young child should be made use of, but care must be exercised by the teacher in the selection of suitable material. For instance, a child could easily memorise "A semi-breve is equal to 2 minims, or 4 crotchets, or 8 quavers, or 16 semiquavers, or 32 demisemiquavers;" but it would be a foolish waste of energy on the part of both teacher and pupil. This illustration suggests one or two of the working rules which the teacher will find of service. Nothing should be memorised of which the meaning is obscure to the child and which cannot be easily explained. Nothing should be memorised which cannot be made of service within a reasonable time. From these rules we may easily infer that the work of memorising must be made as interesting as possible to the pupil. Memorising means the acquisition of new sense-material in the brain, and we know that this is a task requiring the greatest amount of energy on the part of the mind. The utilisation of previously acquired ideas in any possible combination or correlation does not require so great a degree of mental effort as the initial memorising.

Hence we must come to this harder work when the mind is freshest, as, for instance, after a period of rest. From this it follows that the best time for memory work, especially in the case of children, is the morning. Also in the case of the young the will must be stimulated by presenting the information to be memorised in its most attractive form.

Another characteristic of the child is an activity of mind which will not allow the body to remain still for more than a limited time. Hence the folly of expecting a child to "be good," meaning to sit still. This can only be done by finding some interesting occupation which will for a short time stimulate the child's attention. The percepts which are imparted to the child should follow the rules which have just been given, that is to say, they must be such as the child can easily understand, and must also be of interest. By this means the "attention" of the child is stimulated. It is not an exaggeration to say that the stimulation of attention is the most important factor in the teacher's art, and this fact has been recognised in various ways. The old-fashioned music-teacher used to rap the knuckles of his pupils, and by that means he did undoubtedly stimulate attention. Whether he did, in an equal degree, stimulate the intellectual powers may be questioned. It seems almost incredible that in this twentieth century examples can still be found of the brutal music-teacher.

The correlation of percepts so as to form useful concepts must have the most vigilant attention on the part of the teacher. Hence these percepts must be very carefully selected. They should be of such a nature that their logical connection can be easily grasped by the immature mind of a child. Generally speaking those concepts which involve only one "sense" should receive our earliest attention, and then those which include two or more senses. For instance, the relative position of two adjoining sounds in the voice, or of two adjoining notes on the stave, or of two adjoining notes on the piano can be easily grasped. But if we attempt to identify these sounds with their corresponding notes either on the paper or on the piano the difficulty is greater. Yet we find that young



children are, in far too many cases, expected to learn all the notes in the treble stave and to identify their positions on the piano after a few minutes' study. So complicated a concept is quite out of their reach. There are, however, plenty of so-called teachers who value any piece of mental work in proportion to its difficulty. Even if they know of an easier plan they would scorn to lead their pupils in the more pleasant path. So we find that pupils have pieces given them to learn which are far too difficult, and are therefore most uninteresting. Here the grand principle of "attention" is altogether ignored, or perhaps unknown. As the intellect becomes more developed, concepts may increase in complexity. Some psychologists have fancifully supposed that ideas which are easily correlated are contained in contiguous brain-cells, whilst those which are more difficult occupy cells which are more widely separated. In the latter case the attempts to connect the ideas, at first difficult, become easier by repetition, and it is assumed that new tracks have thereby been made in the brain. It is difficult to believe that such operations are physiologically true, and at any rate they are "non-proven." In the next chapters will be given some examples of the way in which concepts may be built up by the music-teacher.

The acquirement of percepts depends, as the name implies, upon an act of perception. The correlation of one or more percepts with other percepts and concepts which have been previously assimilated by the mind requires a greater or less amount of mental activity which results in what is known as "apperception." The stimulation of such mental activity is one of the chief duties of the teacher. For this purpose it is necessary that the teacher shall be familiar with the character of his pupil, or, in other words, that he shall recognise the pupil's "personal equation." In large classes this cannot be carried out to so great an extent as is desirable, but in the case of the teacher of music who has, as a rule, to deal with only one pupil at a time, his duty in this matter is clear. All this is in addition to the amount of knowledge which the pupil possesses. A very timid, nervous

girl, to whom a word of reproach is like a blow, should have different treatment from one who has a good deal of self-confidence. A sudden expression of impatience at a slight error when playing over a piece of music which has been ostensibly prepared for a lesson would overwhelm the timid girl, whilst the more self-confident girl would require a considerably sharper stimulus to disturb her equilibrium. It is too frequently forgotten that pleasure in the pursuit of knowledge is one of the strongest stimuli which a student can possess. On the other hand, it should be remembered that any such stimulus gives pleasure to study for a comparatively short time, and that it can only be continued by the employment of a sufficient amount of fresh stimuli. Sometimes it is difficult, if not impossible, to avoid a period of dull monotony in the study of a subject. Perhaps the point under consideration has not become clear to the student, at any rate in the judgment of the teacher, when there results distaste and repugnance on the part of the pupil. The teacher should take upon himself some of the blame for this state of things and devise other plans for the presentation of the topic under discussion. The concepts which he has tried to develop in the pupil's mind lack clearness, and need to be revised. A useful link may have been omitted from the chain of investigation, or the terms employed in formulating the concept may not be thoroughly understood. Any plans of this kind, by which the subject of instruction may be made clearer, tend to stimulate the will of the student, and hence are of the very greatest service in gaining apperception.

If it were possible to continue the accumulation of percepts indefinitely there would result an unwieldy mass of information, accurate indeed, but of very doubtful utility until systematically stowed away in the mind. We may even go a step further and say that the accumulation of concepts of a rudimentary character does not carry us very far in the way of classification. Fortunately for our comfort and peace of mind it is impossible to employ the intellect on any subject of study without so arranging our concepts that they include a larger number of details than those which we employed in our earlier efforts.

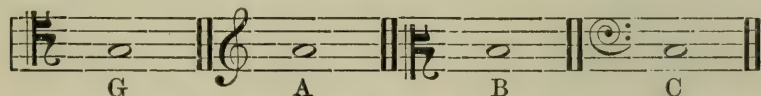
For instance, the concept of scale and that of arpeggio may be included under the more comprehensive concept of interval. The process of formulating concepts is frequently termed abstraction, and with it is connected another called generalisation. By abstraction we eliminate from a number of objects all those things in which they differ, retaining only those in which they resemble each other, and generalisation easily follows those operations. J. S. Mill says that any term which is obtained by abstraction "denotes" a certain object, or quality, and along with this "connotes" what are known as its attributes, whilst such terms as do not imply, in themselves, the possession of any attributes are said to be non-connotative. The name Handel has, in itself, no attributes, but the term "musical composer" is distinctly connotative. The description on p. 27 shows us that the object which we call a piano is, under certain circumstances, non-connotative. As experience is gained we can find many attributes which belong to the piano, as "musical instrument," "article of furniture," and even "instrument of torture." By looking at these connotations in another way we obtain certain abstractions. For instance, by abstracting those things in which they differ from piano, violin, trombone, piccolo, drum, and so on, we obtain the generalisation "musical instrument." Or again, if we abstract in the same way table, chair, footstool, piano, and so on, we obtain the generalisation "article of furniture." The terms "extension" and "intension" are sometimes employed instead of connotation and denotation. Let us employ the plans just discussed in investigating the following diagram:—



We see a sign which consists of a black dot with a stem, and the dot stands in a certain position which we will agree to call the second space. For convenience we will assume that the meaning of the clef is thoroughly understood and so may for the present be disregarded. The sign denotes a certain pitch which we call A, and it connotes a certain time-value which we call a crotchet. It is also just as appropriate to say that the sign

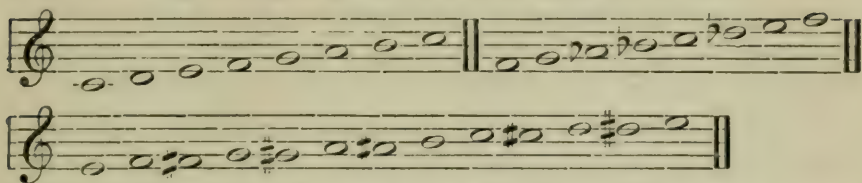


denotes a time-value and connotes a sound value. If we now examine in detail the signs that follow we shall find that they all agree with what has just been stated. We observe that each sign has a different position. By a process of abstraction we eliminate the different positions, when we find that each sign indicates pitch in the same way. We next observe that each sign differs in shape from the others. By a process of abstraction we eliminate the differences of shape, when we find that each sign indicates duration of time in the same way. The generalisation shows clearly that signs of the kind under consideration do two things which when stated in the form of a definition may be expressed as follows: "A note is a sign which represents the pitch and length of a sound. The pitch of a note is shown by its position on the stave and its length by its shape." By a similar process of elimination we may arrive at a rational definition of a clef:—



We observe that all the notes in the above example are in the second space of the stave, but that each of them has a different letter-name. The only thing that is different in the diagram is the clef. Hence we are led by an act of generalisation to the definition: "A clef is a sign which determines the pitch of the notes which follow it." When presented in this way the idea of a clef seems a very simple thing, but there is probably nothing in the theoretical part of music in which pupils more frequently go wrong. A teacher points to the last clef in the above example and says, "What clef is that?" The pupil answers, "The bass or F clef." The teacher proceeds, "Quite right. Why is it called the F clef?" The pupil almost invariably answers, "Because it is on the fourth line." A very delightful example of the fallacy of substituting effect for cause. Obviously the bass clef is called the F clef because it gives the name F to the line upon which it is placed. The reason why pupils do not apprehend this distinction is because they never see this clef in any other position than on the fourth line.

The following example gives us a variety of scales :—



If we examine them we find certain resemblances which might be employed for the making of abstractions. For instance, in all the scales there is a diatonic semitone, E—F, whilst in the first and second scales there is a tone, F—G. In the first and third scales there is a diatonic semitone, B—C. These are very partial generalisations, that will prove to have no practical utility in the framing of a definition. After careful searching we find one point which these scales possess in common, and a little investigation shows that this peculiarity is shared by all other scales. This leads us to the definition: “A scale is a succession of notes in alphabetical order.” Pupils when asked to define a scale usually say “A succession of notes.” But there are plenty of successions of notes which are not scales. Some years ago a candidate for a musical degree defined a scale as “A lot of notes one on the top of another.” We will hope that he has gained the degree, but he certainly was not helped by that reply. After arriving at the definition given above, we can go on to compare the scales a little more closely. This will give rise to a definition which distinguishes between diatonic and chromatic scales, thus, “A diatonic scale ascends and descends chiefly by tones, and a chromatic scale exclusively by semitones.” The definition of a chord is rather disconcerting to the average pupil. The following example consists of chords; let us see in what particular they agree, and in what they differ :—



We know that all the combinations given above are chords. Also that it is possible to construct chords which consist of seven or any higher number of notes. So far the only generalisation

we have reached is that a chord consists of notes, but that is not a satisfactory definition. But we ask ourselves the question, "Suppose there was only one note, would that be a chord?" The answer is in the negative, and hence our definition is: "A chord consists of two or more notes sounded together." The average pupil when asked "What is a chord?" usually describes a triad or else a common chord. The question, "What is the difference between a chord and an arpeggio?" is rarely answered intelligently. The answer is, of course, that an arpeggio is a chord, but with the notes sounded successively. It is unnecessary to pursue this subject to any greater length. Sufficient has been said to show the necessity for great attention to the framing of neat and accurate definitions. These definitions should be given in the pupil's own words, and not simply learned from a book. A satisfactory definition should include a particular aspect of everything to which it can be applied whilst eliminating any detail which might confuse it with any other objects. For instance, a cadence has been defined as a succession of chords. This is obviously imperfect because the phrase "a succession of chords," whilst true of all cadences, is by no means restricted to them. Even if we revise the definition by giving the number of chords in a cadence—"a cadence consists of two successive chords"—there is still something lacking which can only be supplied by specifying the reasons for the employment of a cadence. "A cadence consists of a succession of two chords placed in such a position as to punctuate the musical sentence in which they occur." Here there is no redundancy of expression, whilst at the same time every care is taken to restrict the definition to that to which it actually belongs. The student is referred to the author's textbooks, "*The Candidate in Music*," Books I and II (Curwen, 1s. 6d. and 2s.), for further examples of definitions. A definition should be constructed independently of that contained in the book, with which it should be subsequently compared. There is nothing which conduces more to a clear and accurate knowledge of a subject than the practice which has just been recommended. In all forms of study looseness of thought is



always a danger, and every mental resource which the student can muster to guard against this should be utilised if true progress is desired.

It will be seen that the definitions discussed above involve an act of the mind which logicians call a "judgment." But there are many judgments which by no means answer to the description of a definition. In all cases where we take two notions, percepts or concepts, and assert that one of them is either included in the other, or is excluded from it, we perform an act of judgment. For the sake of completeness the term percept is included in this statement, but it is almost impossible to conceive of anyone who is capable of forming a judgment being restricted to the employment of a percept for one of his notions. When this act of judgment is written out or spoken in a strict and formal manner, the resulting sentence is called a "proposition." A proposition consists of three parts, respectively called "subject," "copula," and "predicate." The subject and predicate are almost invariably concepts, and the copula affirms or denies that one of these is included in the other. When formally set out the copula appears as "is" or "is not," but in actual practice it is incorporated within the predicate. For instance, "All true musicians admire classical music" is a proposition to which we shall all assent. It will be observed that the copula does not appear separated from the extremes of the proposition, but this can be done by a little circumlocution. For example, "All true musicians are admirers of classical music." If we take a proposition like this, and add to it another proposition which includes one of its terms, we may then draw a conclusion from a comparison of these propositions. When set out in regular form the process just described is termed a syllogism. For example:—

(a) All true musicians admire classical music.

(b) Mr A. is a true musician ;

(c) therefore Mr. A admires classical music.

In the above syllogism (a) is called the major premise, (b) the minor premise, and (c) the conclusion. A little examination shows that the particular statement in (b) is included in the

general proposition in (*a*), and that this fact is stated in (*c*). Also it should be observed that the syllogism consists of three terms, each of which appears twice. Of these terms "Admirers of classical music" is called the "major" term, whilst "Mr A" is the "minor" term. The "middle" term, so called because it is found in each premise, is "All true musicians." By means of the middle term we compare the statements of the premises and, hence, draw a conclusion. The major and middle terms are evidently concepts, because each of them is a general term which is employed to designate a "class" of persons. At first sight we should regard Mr. A as a percept, because there is no apparent classification or generalisation in this case. The treatment of what are known to the logician as "singular terms" renders this view untenable. Students who wish for more detailed information on this point are referred to any of the standard treatises on logic. Any further discussion of the subject would be out of place here. That this syllogism fulfils the rules which have been laid down by logicians will be obvious to any who have studied the science of logic. Those who have no acquaintance with logic may say that the syllogism just given is so simple and obvious that it is not worth the trouble bestowed upon it. But let us now slightly modify our syllogism, when we shall obtain the following result:—

(*a*) All true musicians admire classical music.


(*b*) Mr. A admires classical music;


(*c*) therefore Mr. A is a true musician.

Here we have a syllogism which, to the uninitiated, is quite as clear and convincing as the one previously given. Yet the student of logic knows that (*c*) in this case does not necessarily follow from (*a*) and (*b*). A little thought will show that there are many persons to whom we should never apply the term musician, who admire classical music. Hence whilst we may hope, and even expect that Mr. A is a true musician, still that is not proved from the syllogism. The fallacy which is to be found in the syllogism is immediately apparent to the student of logic.

Although formal logic will form no part of the course of instruction imparted to a music pupil, it may well receive the attention of the teacher. Nothing is more advantageous for the acquisition of clear methods of thought than a little of the discipline which a study of formal logic will give. No sounder advice can be offered to young teachers than a recommendation to give a little attention to this subject. The framing of clear and accurate definitions will receive much assistance from a preliminary course of logic. For example :—

(a) Every clef represents a sound.

(b)  is a clef;

(c) therefore  represents a sound.

Even if not drawn out in the form of a syllogism, reasoning such as this will obviate the danger of such an erroneous view of a clef as is given on p. 34. It is much to be regretted that the education of musicians has not lain a great deal more in the direction of such studies as have just been indicated, and also in practical science. For lack of this we have had to suffer from loose and misleading statements in various matters connected with our work. The perusal of a series of controversial letters on voice production always seems to the present writer like a huge joke, for no two of the controversialists ever appear to agree with each other to any great extent, and their reasonings seem to be based on very insufficient evidence. The progress of our knowledge of the true sources of our harmonic combinations has been very seriously hindered by lack of scientific observation, and by *à priori* reasoning which has no foundation in fact. (In the Appendix will be found a note on the pseudo-science of the musical theorist.)



## CHAPTER IV.

### EDUCATIONAL PLANS.

WE have seen that all our notions of the outer world are gained through the senses, that the impressions derived through the senses are conveyed by means of the afferent nerves to the brain, and that there they are transmuted by the mind into percepts and concepts. It will now be necessary to reverse this process by observing the manner in which these concepts are employed in directing the various muscles to do their work. In each case the mandate of the mind is conveyed through the appropriate nerve of volition, more frequently termed the efferent nerve, to a muscle which contracts, and so causes the tendon which is generally found at the extremity of the muscle to move the bone to which it is attached, and hence to form a bend at a certain joint. By means of a second mandate, communicated through another nerve, another muscle contracts, and its tendon brings back the bone previously spoken of into its original position. The first of these muscles is called a flexor muscle, and the second an extensor muscle. Every joint requires both these forms of muscle. (In the Appendix is given a description, with diagrams, of the bones and muscles of the hand and arm.) It is obvious from what has been said that all our work, either as players or singers, may be reduced to simple movements of the muscles. Even the most artistic and soul-stirring performance may be reduced to this simple form. The accurate adjustment of our muscular movements should have our closest attention. It is for lack of this attention that so many singers when commencing a new phrase make a slide to the first note, or, in other words, take too low a pitch at first and instantly tune the voice to the correct note. The peculiar "scrape" favoured by some baritone singers results from this

fault in voice production. Owing to imperfect muscular adjustment some clarinet players when a phrase occurs which commences with a rather high note precede it with a very perceptible "quack." A very common form of imperfect muscular adjustment is the striking of the left hand before the right in pianoforte playing. All these faults are, when once firmly acquired, almost ineradicable.

It is a truism to say that the best educational plans are those which most closely follow the mental development of the pupil. Hence when teaching very young children we should, whenever possible, confine ourselves to the imparting of suitable percepts. But the question may be asked, can we do this in the case of musical education? The answer is in the affirmative, if care is taken to choose suitable topics. The first steps must be devoted to the teaching of very simple songs by ear. By the employment of suitable plans the attention and interest of the children can be fully maintained, and their retentive powers suitably stimulated. There is a right and a wrong way to teach songs to young children, and the wrong way is far too frequently employed even amongst those who are professional kindergarten teachers. For instance, when a new song is to be learned the mistress sings the tune, and the poor unfortunate victims follow as best they can. How is it possible that they shall take an interest in such a performance? Their feeble pipings would be grotesque if they were not so pitiful, at any rate when listened to by an educationist. From a musical point of view the plan just described is very unsatisfactory. The children do not sing in tune, and the quality of tone they produce cannot receive attention. A moment's consideration will show that this must be the case, because the mistress when singing cannot hear the feeble voices of the children. To obtain the best results the mistress must never sing with the children. Choose a song of which the compass is limited and the words can be easily understood. Sing the first line, or a portion of it, briskly, with clear pronunciation, and as good a tone as the performer can produce. Repeat the line once or twice at discretion and instantly call on the children to reproduce what they have

heard. It is of importance that the children's performance should follow instantly upon the conclusion of the teacher's model. By this means the vivid impression produced by the teacher's singing in the children's minds has not time to become dim. If it is absolutely necessary the teacher may sing the first note with the children to give them a start, but this is better done by the sharp stroke of a piano key. If the children are not successful at a first attempt the model must be given again, after the faulty points have been shown, and this should result in a better performance by the children. The next phrase should be treated in the same way, and then the two should be joined together. Those who have never tried the experiment just described will be surprised to find how rapidly a song can be memorised by such means. In the work just described no attempt is made to give the child any concepts of even the simplest kind. Those who are musically gifted will soon begin to have rudimentary ideas of "form" and of "key relationship." They will also, in action songs and marches, gain some notion of "rhythm." These rudimentary concepts will be of value when the more serious business of mastering the details of musical notation is taken in hand.

A word of protest must be spoken here as to the shameful way in which the voices of the young are, in far too many instances, abused and spoiled. A child's voice is produced by the most perfect and beautiful musical instrument in the world. At the beginning of life the voice of a healthy baby is perfect in every way. A vocalist can have no better example of vowel sounds than those produced by a baby. They are absolutely pure and without the slightest admixture of "glides" or diphthongal sounds. Even when the feelings of the baby are roused by a violent stomach-ache or by the painful punctures of an erratic pin, the stentorian cries which arise are perfectly produced, or, to employ the jargon of the teacher of voice production, the voice is "properly placed." Far before all the conflicting theories of the voice-trainers is the practical example of the baby. The vexed question of the proper method of breathing can be settled by the same means. In other ways the



muscular adjustments of a child are perfect, for children do not sing out of tune unless as the result of imperfect training. This point was established by the author after exhaustive experiments with his own children.

The training of a child's voice commences from the first moment that an effort is made to imitate what is said or sung by a member of the household. This question of environment is of the greatest consequence if there is any desire that the child shall display a good quality of tone after the lapse of a few years. Bad pronunciation, imperfect vowels, harsh tones, breathy tones, all are observed by the receptive mind of the child and all are imitated. The dictates of fashion say that a girl must not shout. She speaks with a subdued tone which in many cases becomes breathy and hoarse. Then the girl goes to a "professor of voice production" and he prescribes certain nostrums which are devised from his preconceived notions of the action of the vocal organs. Nothing will be said here as to whether he is right or wrong, but out of so many conflicting theories, most of them evolved from purely *à priori* notions, some, at any rate, must be wrong, and possibly some may be right. Judging from the writings of the voice-trainers each one has the only correct system, and all the rest are wrong. The only true theory of voice production is that which takes as a model the vocal performances of a baby of about six months old.

Turn we now to the first formal lessons in singing where the pupils are very young. It will be convenient to assume that they have had a little singing by ear, as previously described. The simplest concept will consist in the comparison by ear of two carefully selected notes. What those two notes shall be is a matter of individual taste and opinion, but the plan of selecting two which are a perfect fifth apart is at least as good as any other. They should be presented to the minds of the children in as many ways as possible, as by this means their attention will be stimulated and maintained. Here are a few examples of what may be done in this way. The teacher sings the notes, the children imitate. After a few attempts the exercise is

repeated at a higher or lower pitch. The teacher sings the lower note and the children respond with the higher note. Afterwards this order is reversed. One half of the children sing the lower note and the other half the higher note, at either the same time or successively. The teacher sings a note and the class decide whether it is the high or low note. Two objects are selected to represent the notes, which are sung whilst the teacher points to them. Two children selected from the class may personify the notes, and these notes may be called by their names. Short sentences may be constructed which will be interesting to the class, and these, after being sung by the teacher to the given notes, presented in any appropriate order, will be repeated by the class. The objects, animate or inanimate, which have been selected to represent the notes will be indicated by the teacher as each syllable is sung. When the children become skilful in following the teacher's pointing we have an early example of sight-singing. Half-an-hour may be pleasantly spent in such exercises as have been described, with the result that the concept of a fifth is firmly fixed in the minds of the children.

At the next lesson the teacher's first task is to see whether what has been previously imparted is accurately retained. There is no question but that such would be the case. A new percept is now imparted and is immediately associated with the concept which has already been acquired. This percept consists of a note which stands almost midway between the two already given; that is to say a major third above the lower note and a minor third below the higher note, the three notes together forming a major triad. The devices which have been already described can again be employed. When this lesson is thoroughly learned it will be time to give names to these notes. These names must be selected on account of their mnemonic value, as well as for the facility with which they may be employed. The use of the "fixed Doh" is quite out of the question, for it is an exploded system, at any rate so far as class work is concerned. Figures to represent the degrees of the scale may be employed. Their use is not desirable because they do not

conduce to the acquirement of pure vowels. Words like "four" and "five" are anything but pure in their vowel sounds, especially as sung in some parts of the country. On all grounds the Sol-fa syllables as employed in the system of Solmisation known as the "movable Doh" are to be preferred. In this case the names of the notes are doh, me, soh, and their initial letters should be written on a blackboard in such a position as to show their relative pitch. Exercises would be written on one line as—

d   d   s   m   s   s   d   m

These would first be practised to the diagram just described and then to the actual notes as above. Here we have a first example of a "train of symbols" which the children will learn to take in their proper order in the mind. Accuracy in this respect is of the utmost importance for effective mental training. Far too many pianoforte students are very helpless when asked to interpret correctly a "train of symbols" such as is found in their "piece." After being Sol-faed the notes given above should be vocalised, and at last the teacher should add words which will be interesting to the children. The next step would be to have notes of different lengths. At first only two time-values would be employed, of which one is twice as long as the other. Their relative lengths would not, however, be stated in this way, but only as long and short. This can be done by writing notes as previously described and placing a sign over those which have to be lengthened. At this stage there will be no difficulty in showing the relative positions of the three notes, doh, me, soh, on the stave, and practising them from a blank stave drawn on the blackboard. It is, however, questionable whether so early an introduction of the stave is desirable. The relative positions of the three notes can be easily understood by the children, but such knowledge is of no immediate practical use to them. It is most undesirable, especially in the case of young children, to introduce new concepts which cannot be used constantly.

The synthetic process just described can be continued until a very thorough knowledge of the notation both of pitch and time is thoroughly acquired. If care is exercised in the



introduction of new topics the more complicated concepts which have now to engage the student's attention will be as easy to understand as those simpler concepts which are all that are required in the introduction of the subject. Always remember that no attempt should be made to rush at too rapid a rate through the topics to be taught, because by such a plan the less receptive members of the class will be left hopelessly in the rear. The true teacher is not satisfied unless he carries with him the whole of his class. He values at its true worth the advice to "hasten slowly." In addition to correctness of time and tune, attention must be paid to the clear enunciation of the words and also to style and expression.

From what was stated on p. 4 it will be inferred that any rational plan of teaching music, vocal or instrumental, must be based on the assumption that the beginner differs from the accomplished performer only in the extent of his acquirements and not in any other way. Both technical skill and expression must follow exactly the same lines. How can this be done on the piano? The accomplished player can find any notes on the piano by reference to the page of music on which they occur. He can perform them at a very rapid rate and with varied force. The beginner can find a very few notes by reference to the page of music on which they occur. He can perform them at a moderate rate and with varied force. In his case the varied force is, in far too many cases, quite neglected by his teacher. The accomplished player can set out the most complicated time-divisions, giving to each note its exact value. The beginner can see his way through very simple time-divisions, giving to each note its exact value. The accomplished player is not always a good sight-reader, but he should be able to give a decent interpretation of any piece of music which is not unduly difficult the first time he sees it. The beginner can play anything of very limited compass, and with easy time-divisions, at sight. So we might go on enumerating the qualifications which must be possessed by the beginner equally with the advanced performer, but enough has been said on this head. Any teaching which does not aim for the objects enumerated above

is based on wrong lines. It is to be regretted that a very large amount of the teaching which goes on throughout the country does not fulfil the conditions which have just been laid down. In far too many cases it is forgotten that a beginner is a good player "in the making." Let us see, for a short space, in what way it is possible to observe these conditions.

It is not possible to commence the study of the piano with percepts alone. Two or more percepts must be combined into a concept, which should be of the plainest and simplest character. The right hand is placed in correct position on the keyboard and a finger presses the note over which it is placed. Here we have a percept of touch and another of sound, and the two are associated with each other to form a more elaborate percept. There is no percept of sight because the eyes should not be employed in the search for pianoforte keys. Here is an example of what the accomplished performer has to do, and which is generally neglected in the case of the beginner. After one note is struck with its appropriate finger the adjoining note must be treated in the same manner. Here we obtain a concept—adjoining fingers take adjoining notes. The same pair of fingers must be removed to other notes, and also the same notes must be played by other pairs of fingers. These plans may be varied to any extent. By such means the full value of the concept which has just been acquired is amply shown. From this we may take in the next note when our concept is enlarged, for we find that notes a third apart require pairs of fingers which are next but one to each other. As before, the hand should be removed to different parts of the keyboard. Gradually more notes will be taken in until each finger is assigned to one of these notes, whose relative distances should be studied in connection with their appropriate fingers. Similar exercises should be practised with the left hand. The statements just made with respect to the relations between notes and the fingers to which they are assigned admit of many exceptions, but these exceptions belong to a more advanced stage in the student's progress than is assumed for the moment. They are fully discussed in a later chapter. It is, perhaps, unnecessary

to insist upon a correct position of the hand and a correct movement of the fingers from the very first attempts at the keyboard. To ensure this being done the pupil must not be allowed to play loudly until after a considerable amount of muscular training. Young children very frequently play much too loudly, with the result that they acquire a stiff wrist and a cramped position of the hand. This should be checked at once, otherwise the faults just described will hinder if not actually prevent the acquisition of a really good style.

So far nothing has been said about the letter-names of the notes, but this additional concept must now be added to those already acquired. Select any note and assign to it a finger. This note must be found by the touch alone, in which the grouping of the black keys will be found of great assistance. A diagram of a part of the keyboard may be placed before the pupil. The adjoining note must now be found, as previously described, and its letter-name duly noted by comparison with the note already learned. The hand must now be moved to right or left and the new notes covered by the fingers identified. Other fingers should also be employed, and the process continued until any series of five adjoining notes can be identified by the touch alone. It is not necessary to proceed any farther in this direction, since future developments in the finding of notes by the touch can only follow the plans just described. Training such as has just been described is far too rare, with the result that the pupil's progress is very seriously impeded. On innumerable occasions the present writer has said to a pupil, "You look away from the copy to your fingers very frequently, have you ever been told of it?" The answer is "No." "How many times do you think you looked down whilst playing that page?" The pupil says, "I really don't know—perhaps twice." Imagine her stare of incredulity when the teacher says, "I counted, and you looked down more than a hundred times!" That is by no means an exaggeration. How can a pupil play with ease and fluency when the attention is distracted by this constant looking upwards and downwards?

When the pupil has thoroughly realised the distances between



notes and their association with particular fingers it will be desirable to have a little very elementary dictation. The teacher will call out the letter-names of notes which the pupil will instantly press. This may be varied by asking for a note at a certain distance from one already pressed, but without stating its name. These distances may be given by the usual musical terms as "3rd above" or "4th below," or a more familiar plan may be adopted, as "next door but one to the right," or "next door but two to the left." The latter plan would probably create a more vivid impression on the pupil's mind than the former, but the choice of suitable devices must ultimately depend upon the peculiar circumstances of the teacher who employs them. The next step is to write the letter-names of notes in any order on a piece of paper. These should be played by the pupil several times, first forwards and then backwards, until fluency is attained. As a matter of convenience it is desirable not to allow any exercise to exceed the compass of a "five-finger exercise," but the hand may of course be removed from one part of the keyboard to another. For the employment of letters in the way just described the reader is referred to the author's "Imperial Method" (Curwen, price 2s.).

Arising naturally out of what was said in the preceding paragraph comes the question of the cultivation of the ear. This very important matter by no means receives the attention which it deserves. At the present stage the pupil should be asked to decide whether two notes which are struck successively are adjoining notes or are more widely separated. The actual distance between the more widely separated notes may be disregarded for the present. When a certain amount of skill is gained these notes may be struck simultaneously and their relative positions determined by the pupil. Numerous expansions of these plans will suggest themselves to the thoughtful teacher, who should not rest satisfied until his pupil displays a certain amount of skill in the detection of notes and intervals. Doubtless there is very great disparity between the skill displayed by one pupil as compared with another, but it is almost incredible that anyone is actually devoid of a musical

ear. Many cases which, at first, apparently come under this head can be made to show good results owing to persistent efforts on the part of both teacher and pupil.

As soon as the pupil can play exercises of the character just described with ease, it will be necessary to commence the study of the orthodox musical notation. With respect to the letter-names of notes it cannot be too strongly insisted upon that no more shall be learned than what are about to be used. The stave should be explained and the relative positions of notes should be shown, as, for example, that notes are regarded as being next to each other when one note is on a line and the other is in the next space higher or lower. Also that two notes on adjoining lines, or in adjoining spaces, are next but one to each other. Knowledge of this character is very rarely imparted to pupils, in fact only a comparatively small number even of advanced pupils have realised that of two notes which form an octave one is on a line and the other is in a space. As soon as an elementary knowledge of the relative positions of notes on the stave has been gained, this new concept can be added to that which has previously been acquired. The position of one note on the stave must be correlated with the corresponding note on the piano. Which note shall be selected for this purpose is a matter of opinion, but it is well that the earliest exercises shall be included within the stave. If it is agreed that this contention is sound, the important note "middle C" will have to be disregarded for the moment. Probably the most convenient note is that which corresponds with the clef. This will save a good deal of trouble when the concept of a clef has to be imparted to the pupil. The exact position on the keyboard of the selected note must be shown and always insisted upon in practice. It is for lack of this early discipline that some pupils are indifferent whether they play notes at the correct pitch or one or two octaves higher or lower. When one note is thoroughly known those which are higher or lower can be named and assigned to their appropriate piano keys. If the foundations are carefully laid as just described the superstructure can easily be built up until at last any note can be found by the touch alone.

Very soon after the pupil has learnt to find notes on the piano solely by their letter-names the question of "time" must engage the teacher's attention. At first the notes will have the same length, and precision in this matter must be insisted upon. Anything like a halting performance must on no account be tolerated. Successive unequal notes will next engage the pupil's attention, when those notes which have to be prolonged have placed over them an appropriate sign. So long as the notes are unequal in length no attempt must be made to give them a definite ratio—that will come later. When the stave is used it will be necessary to employ the usual kinds of notes, but to insist upon the pupil learning the names of those notes is most undesirable. It will be sufficient at first to show only two kinds of notes—for instance, minim and crotchet, explaining that the former is longer than the latter. After this is realised the fact that the minim is twice as long as the crotchet must be demonstrated, and the pupil must be shown how to hold on the longer note whilst two of the shorter notes are played in imagination. This plan of referring to shorter notes in a piece of music and imagining a certain number of them to be struck whilst a longer note is being held on is a plan which may be employed with advantage even with advanced performers. The next step is, obviously, to teach the pupil to realise the concept of a bar, when the chief new idea is the placing of accents at regular intervals. The division of a beat immediately follows what has just been described. At first only half-beats will be employed, and afterwards more elaborate subdivisions. One piece of advice must be offered to the teachers who read this book—don't introduce the word "and" into your counting. It is a most useless device. If we had only beats and half-beats in our music something might be said in favour of "and," but when we come to quarter-beats this device ceases to be of any serious value. A far better plan is to measure the longer notes in any particular piece of music by comparison with those that are shorter. The French time-names are of very great value if they are thoughtfully used, and if the more complicated names are reserved for study until they are actually required. The



plans suggested above can be followed out whilst more and more difficult rhythmic combinations are introduced. One fallacy in the teaching of time must be mentioned before leaving this part of our subject. It is far too frequently the case that the chief importance is given to the lengths of notes, and pupils are expected to give the music they are playing in correct time by reasoning on these lengths. It is no exaggeration to say that a worse plan than this has never been devised. The chief thing is the recognition of the moment when a note must commence—in other words, the rhythmic movement must be maintained at all costs. If this point receives due attention the lengths of the notes are a matter of secondary importance, for it is practically impossible to go wrong in this respect. Some illustrations of the difficulties involved in teaching time will be found in a future chapter.

The acquirement of technical skill is the next topic which must claim our attention. No attempt will be made here to inculcate any particular system of technical practice. All plans are equally good if they obtain the required result, and the "personal equation" of the teacher is of more importance than the particular nostrum which he or she employs. The only condition which is of real importance is that the mind shall be in such a condition as to be able intelligently to direct the work which has to be done. Not only so, but any technical practice which is gone through in a perfunctory manner is worse than useless. As soon as it is felt that the attention begins to flag the mind must turn to some other occupation. It is the duty of the teacher so to stimulate the mind of the pupil that interest is maintained. This can only be effected by presenting the work which has to be done in an attractive form. In this particular it must be always remembered that plans which are found successful with one pupil, or with one teacher, may utterly fail in other cases. Here we have another illustration of the importance of the "personal equation." The materials employed must be adapted to the growing mind of the child. Hence in many cases pure technical practice has to be reduced to a minimum, whilst the actual benefits to be derived

from such practice must be gained through music which is so attractive to the child that it will not be neglected. The rules given with relation to the study of other subjects equally apply to technical practice on the piano. "Proceed from the simple to the complex." The one great danger, especially with young teachers, is the endeavour to push on too rapidly. The adage to "hasten slowly" and the fable of the Hare and the Tortoise illustrate this point. The same precautions must be applied to the direction, "Proceed from the known to the unknown," or, in other words, "Grasp new truths by the help of previous experience." The discovery of new truths in this way is a pleasure to the pupil quite apart from their usefulness. The exhilaration which arises from this plan must not be stimulated for too long a period at once, otherwise there will result depression of mind owing to the inevitable reaction. The desire to interest the pupil in the way just described is apt to give rise to flimsiness of work. The skill of the teacher is best shown in trying to interest the pupil after the first glamour of novelty has worn off. Steady, solid work is required if a satisfactory result is to be looked for. Here it seems necessary to utter a word of warning to the teacher. Thorough work must be regarded as a goal to be aimed at, but must not be expected for a considerable time. It is a suicidal policy to insist upon one piece of work being finished before another is attempted, because such a plan tends to discourage the pupil and so defeats its own end.

The first step required in the technical training of the pianoforte pupil is to ensure that any note shall be struck with pure tone and with a fair amount of force. Nothing is said here as to the position of the hand, the curvature of the finger, or the elevation of the wrist. It is clear that if the result which has just been formulated is attained the position of the hand and finger cannot be wrong. When it is found that any finger can strike its note a succession of two notes must be attempted, at first slowly and then more quickly. The pupil must be taught to play these notes in strict time. All the details which have been so far discussed imply the following operations. The mind

through an efferent nerve issues a certain direction to a flexor muscle, or combination of muscles, to contract, when a finger will fall on the key with sufficient force to produce a sound. After a certain interval of time a new mandate is sent to an extensor muscle, which by contracting raises the finger from the key, whilst at the same instant another flexor muscle actuates a second key in the same way as the first. By means of the auditory nerve the sounds produced are conveyed to the mind, where they will, in the case of all intelligent practice, be criticised, with the result that the notes when repeated will be improved both in precision and in quality of tone. The sensation of touch in the tips of the fingers conveyed by afferent nerves to the brain will, if attended to, be found of assistance for attaining this result. An excellent aid in this kind of practice is the use of the clockwork metronome. Obviously the only two things we can do to a key are, first, to put it down, and secondly to take it up. If these operations are correctly performed we cannot go wrong. This is an epitome of all that can be said with respect to technical practice.

The linking of movements described above can be carried forward until all the fingers are engaged. At first the succession of movements will be of a simple character, but they will gradually become more complicated. All such successions of movements tend to become habits, and at last will be what is termed "secondarily automatic." Every movement will be suggested by that which precedes it, so that at last the active direction of the mind appears to be non-existent. After five notes have been studied as just described the subject of scales will next engage the attention of the teacher. Here the passing of the thumb under the fingers, or the reverse operation, must receive special attention, until in a longer or shorter time this new movement also becomes secondarily automatic. Although coming much later in the pupil's education a word must be said here as to double-note scales. In the case of scales in double thirds there will be the movement of the thumb and also of a finger. These combined movements must become secondarily automatic if a successful result is to be attained. What has



been stated with respect to scales in double-thirds applies also to those in double-sixths or in double-octaves. The performance of arpeggios requires the assistance of those muscles in the back and the palm of the hand by means of which the fingers are separated and brought together again. Other muscles assist in arpeggio playing, such as those which bend the wrist, and also those which cause the pronation and supination of the hand. It is not necessary to further extend this list, but a little thought will serve to show how complicated a piece of work is the task of adjusting various sets of opposing muscles. Yet the work is so thoroughly done by an earnest student that there is no appearance of effort. The various adjustments which have been spoken of depend upon a keen and prompt use of the muscular sense, such use being the result of intelligent direction by the mind. It is unnecessary to carry our investigations in this direction any farther, since all that might be said must follow the lines which have just been laid down.

Assuming that a pupil has gained the power of striking notes with various degrees of force, and this should be the case after the very first lesson, an attempt should be made to get expressive playing. How shall this be done? The enthusiastic young teacher who plays with emotion cannot understand why his pupils fail to follow him in the demonstrations which he gives during the lesson. So he scolds them for their want of "soul," and questions if they are possessed of an atom of genuine musical feeling. He says that they do not even attend to such directions as *p* and *f*, and hence that it is hopeless to expect them to display any initiative in finding out places where more minute changes of force might occur. He is probably quite wrong in his estimate of his pupils' musical sensibility. He forgets that music is to them an unknown tongue, and, like all other languages, must commence with the rudiments. Hence his first task must be to analyse musical expression until he discovers the elements of which it is composed. These are four in number: (*a*) playing louder, (*b*) playing softer, (*c*) playing slower, (*d*) playing quicker. To any particular note we can apply one of these devices, or if we desire to be more intense we can select two of them, as for

instance (*a*) and (*c*), (*a*) and (*d*), (*b*) and (*c*), or (*b*) and (*d*). In fact so much is expression a matter of dynamic values that it looks as if a suitable piece of mechanism might display a series of curves corresponding to varying force and speed, in form like a meteorological chart. Until pupils are shown, they do not realise that a *crescendo* simply means that each note receives a heavier blow than the one which precedes it, or that in a *rallentando* each note of nominally the same value is in like manner made slightly longer than the one which precedes it. When these concepts are clearly apprehended in the mind the pupil will have little difficulty in applying them to the performance of music with expression.

What has been stated above applies with equal force to the study of all other instruments. So far as the naming of their notes is concerned, the directions previously given may be utilised at once. What relates to the particular *technique* of any instrument must be left for the elucidation of the specialist. On most of these instruments adjoining notes are produced by adjoining fingers, whilst those which are farther away require fingers which are not next to each other. On the violin the selection of suitable fingers under these circumstances is complicated by the fact that successive notes which are at a distance from each other on the stave may have to be taken on adjoining strings, and very possibly with the same finger. Also notes which stand next to each other on the stave may not be taken on the same string. Under these circumstances the succession of fingers which have to be employed is by no means obvious at a first glance. In the same way the different "registers" of the wood-wind instruments may present difficulties where notes are at some distance apart, or even when they stand next to each other on the stave. What has just been said also applies to brass instruments. Whatever differences may be observed they will be easily vanquished by the earnest student.

We have seen how impressions conveyed to the mind result in certain impulses being sent through the efferent nerves by which the muscles are caused to contract and the fingers are moved. We must now enquire in what way the pupil may be stimulated to acquire the requisite dexterity as a performer.

## CHAPTER V.

### ATTENTION.

INCIDENTALLY the word "attention" has been employed in the preceding chapters, and the reader will have been able to gather its meaning as applied by psychologists. It is no exaggeration to say that the whole of the efforts of the teacher may be summed up in the stimulation of his or her pupils' attention. By means of attention the passive operation of perception in the pupil's mind is converted into its active equivalent which is termed "apperception." Previously acquired percepts and concepts rise into consciousness in such a way that the newly presented knowledge is incorporated with them through the activity of the pupil's intellect. This stimulation is best effected by presenting the operations to be performed in an interesting and attractive form, either when studying such a subject as musical theory, or when trying to gain skill in performing on a musical instrument. When a subject is presented in an attractive way the pleasurable emotions of the pupil are excited, and hence the Will is stimulated. Only by such means can the best results be obtained. There are, of course, pupils whose desire to gain knowledge is so great that they will progress under the most depressing circumstances, but even they would find their task pleasanter and their educational advance more rapid if the teacher took some pains to present the requisite topics in an interesting manner. But the large majority of pupils require what, in the case of little children, we call coaxing, if the best results are to be obtained. A very successful schoolmaster illustrated this idea very happily when he said to the present writer "Any boy will learn if you make it worth his while."



The whole theory of successful teaching is wrapped up in this homely sentence, and it will be well if we look upon it as a text upon which this chapter and those which follow are founded.

In the preceding chapter the attempt was made to illustrate the fundamental principles upon which skill on the piano may be attained. These were applied to the most elementary part of our work, but it will now be necessary to carry our investigations a little farther. In the elementary work just alluded to one rule was always tacitly observed. Have a maximum of practice to a minimum of theory, or, in other words, tax the memory as little as possible. How different from the plans universally employed up to within a few years ago! Then a child was set to learn all the letter-names of the notes in the treble and bass staves, all the time-names from semibreve to demisemiquaver, the names of the notes on the keyboard and the numbers of the fingers to be employed. There may have been other topics, but these will suffice to illustrate "how not to do it" in teaching. It is easy to imagine the feeling of confusion and utter despair in the mind of the average child when contemplating this formidable mass of knowledge, and whilst attempting to evolve order out of chaos. Teachers of music were not worse in this respect than teachers of other subjects. At that time it was considered to be a merit to make every topic as hard as possible, so that pupils might have something with which to exercise their intellects. But their plans resulted in a maximum of labour and a minimum of result. In those days most boys used what was known as the Eton Latin Grammar. All the rules which it contained were given in Latin, which the student had to memorise at a period when the words were mere jargon to him, for he knew absolutely nothing of the language. Is it any wonder that "attention" could only be stimulated by brutal means under such circumstances? Some specially gifted pupils managed to pass successfully through this preliminary ordeal, and the pleasurable emotions and the stimulation of the Will previously alluded to would display themselves when construing some of the great Latin authors such as Virgil and Cicero. In

by far the large majority of cases the most striking evidence of Will would be a determination to abandon the study of Latin at the earliest possible moment, and this would be the only pleasurable emotion connected in those boys' minds with the study of the language.

A percept which enters into the mind and remains there in a state of subconsciousness is recalled by an act of memory, also termed by psychologists Reproductive Imagination. If the mind worked unerringly the reproduction of this percept at any distance of time would present no difficulty. But such is by no means always the case, as a familiar illustration will show. You go to an evening party. The hostess says to you, "Come with me, I wish to introduce you to a young lady who has frequently heard of you from common friends." The introduction is made and a few pleasant words are exchanged about these common friends. You then leave the young lady and discover, to your dismay, that you have forgotten her name; at least that is the present writer's experience. Why should that be the case? Because there is nothing in her appearance with which we can associate her name. If she had been called Miss Long the Law of Similarity would have operated to advantage whether she was tall or short, and so of other names which will appeal to the reader's imagination. The above illustration very happily displays the difficulties of teachers in the cultivation of their pupils' memory.

The words which we use to describe objects have no necessary association with the things that they represent, except those known as "onomatopoetic" words, in which the sounds of the things described are represented more or less closely as "buzz," "creak," "cuckoo," or in the case of words which can be classed as derivative. Take, for instance, the word "plate" which will first be associated with a familiar article of crockery-ware. There is no necessary connection between the word plate and the object it represents, but after mastering this use of the word it is very easy to transfer it to a brass plate or plate-glass, and so of other words. A child very soon connects various articles employed in the house with their names, such as plate,

chair, spoon, table, and the like. This is done unconsciously, and is owing to the frequent use of the names in immediate connection with the articles they represent. We have here an illustration of what is known as the Law of Contiguity, by which things and names which are frequently associated become inseparable in the mind. In this case the operation of the Law of Contiguity is aided by the interest which the child takes in these articles of furniture.

There are many names employed in musical study which are by no means suggestive, and which have to be learned by means of repetition aiding the Law of Association. Yet there are teachers who are very unreasonable in their expectations of what ought to be memorised by their pupils. For instance, a teacher points out a note in her "piece" to a pupil and asks her what kind of note it is. She does not know. He tells her that it is a crotchet, but does not use any means by which her mental adhesiveness may be stimulated. When she comes for her next lesson he happens to ask the same question, and again receives the same answer, which causes him to storm and rave at the forgetfulness and the carelessness of his pupil. But he is unreasonable, for there is nothing in the shape of the crotchet to suggest its name. The French girl is more fortunately situated than her English contemporary. If she were asked to name the note she would say *une noire*, which describes its shape. In the case of the crotchet rest the advantage would be with the English girl who would associate its shape with the initial letter of its name. The French girl would say *un soupir*, which has no necessary connection with the object it describes. The German girl would call the crotchet a quarter-note. Here the connection between the shape of the note and its name is not so direct as in the case of the French name, but it can easily be memorised by the consideration that the whole-note has the simplest shape, the half-note is formed from it by the addition of a stem, whilst in the quarter-note the oval of the two previous notes is filled in. By learning the order of the notes semibreve, minim, crotchet this mnemonic is available for the English girl. The name quarter-note is valueless in studying rhythm, for the



crotchet usually represents a beat. But the English names are positively misleading, for a crotchet is not in any way crooked, and a minim is not little. The teacher's best plan is always to make use of these names when speaking to pupils of the notes they represent. By this means they will gradually be memorised owing to the interest which the pupil is bound to take in them.

It is not necessary further to discuss the value of technical names when speaking of any tools which we have frequently to employ. The joiner could do his work if he never used the names hammer, saw, or plane, but how inconvenient this would be if he had occasion to work along with colleagues. If he declined to employ such terms as the above he would have to devise others, or else to employ appropriate signs, the alternative being an amount of circumlocution which would be intolerable to all concerned. The same remarks apply to musicians, and hence to their pupils.

To the average pupil the study of musical theory is regarded as a necessary evil, a dead weight which must be carried by the pupil whose progress is apparently much impeded thereby. It can, however, be shown that the acquisition of a competent knowledge of musical theory, instead of being a repellent task, can be made attractive and interesting to a large majority of students, if not to all. Here are a few illustrations of what may be done in this way. Instead of toilsomely building up key-signatures by placing each sharp a 5th higher or a 4th lower than the one which precedes it, how much better to memorise a mnemonic line such as "Father Charles Goes Down And Ends Battle," and to utilise the initial letters of these words when writing the signature. Anyone who has watched the slow uncertain movements of the pupil's pen when employing the former plan, suggestive of the motions of a perplexed caterpillar, must prefer a device which is both more rapid and less liable to error. What has just been said may be applied also when flat-signatures are required, and the mnemonic line just given will be read backwards. The study of intervals can also be rendered less irksome by the adoption of suitable plans. If the pupil refers to a set of major scales, the first and second notes of any major

scale form a major 2nd, whilst, in the same way, the first and third notes form a major 3rd. When these are discovered minor 2nds and 3rds can be formed with very little trouble. Afterwards larger intervals can be studied in the same manner. By continual reference to various major scales the pupil will insensibly memorise them, when the book which contains them can be abandoned. Written exercises on the various topics in elementary theory should be worked by the student. A suitable set will be found in the author's "Musical Copy Books" (Curwen). In these books there are first some easy exercises on every department of elementary musical theory, and these are followed by more difficult problems by which the student's ingenuity is exercised. When suitably planned such problems can be made to cover a good deal of ground, so that the pupil has to utilise knowledge which has been pleasantly acquired, instead of through a laborious and repugnant grind. For instance—"Give the signatures in the bass clef of the major scales in which A is the mediant, subdominant, and leading-note," is not a difficult question, but it demands the ready use of several items of knowledge. Or take a more difficult question—"Write the minor and major 3rds in the key of A flat. By enharmonic change convert each into a chromatic interval and specify the keys in which they are found." A good deal of vigilance is required for an accurate and complete working of this problem. It is unnecessary to give any further illustrations of what may be done in this way, but there is no question of the value of such problems for sustaining the interest of pupils. In the solving of a problem, either in arithmetic or in musical theory, there is an amount of pleasurable excitement which incites the pupil to persevere, and no amount of dull dreary study can replace this. Another plan which develops the pupil's readiness and accuracy is very useful, especially in the case of a theory class. The teacher asks a question to which the pupils must write down the answer instantly. At once the teacher calls out the correct answer and those pupils who agree will take a mark. The questions must be of a simple character and of which the answers are very short. At the end of the questions

the pupils will add up their marks so that the teacher may know how each one stands. Perhaps some one may object that a little cheating is liable to be attempted, and that the plan just described is really an encouragement to such deceit. To this objection the reply is that a teacher who cannot after a very few lessons detect such cheating has missed his vocation. The quick questioning which has been described tends to make the pupils vigilant and accurate. It is astonishing what ridiculous answers are given previous to such training, the result of inadvertence and confusion of mind. The following examples show what can be done by intelligent pupils who certainly know much better. "What is the signature of the key of F?" Answer, "One sharp." "What kind of note do two crotchets make?" Answer, "One quaver." After a very little practice foolish answers such as these will be eliminated owing to the mental discipline which the pupils have undergone. All practical teachers must see this, and are advised to adopt the plan just described in other departments of education. But the *doctrinaire*, from his position of self-constituted superiority, indignantly exclaims "Where is the music in all this questioning?" Perhaps if he saw a cow enjoying a meal of sliced turnips or mangel-wurzel he would express his indignation to the farmer, whilst pointing to the trough, in the words "Why do you feed your cattle on such stuff as this? This is not milk." In both cases what is employed is a means to an end, and can only be justified by its success. The foolishness of the latter remonstrance is very obvious, but it is not any greater than that which has reference to problems in musical theory. The farmer would be able to speak as to the utility of the fodder he employed, just as the present writer can guarantee the value of exercises such as have been described.

The first steps in the study of harmony are frequently very irksome, and this is largely owing to the lack of suitable teaching devices. To ask a pupil who has never made a previous attempt to add upper parts to a long figured-bass is to court disaster, the pitfalls in such a piece of work being so many and so varied. The student is told that a note must be



continued in the same part wherever possible. Yet how frequently do we find that the tie, the sign of continuation, connects two notes, one of which is in the alto and the other in the treble. Then the frequency with which forbidden consecutives appear, and the apparent impossibility of avoiding them, are very discouraging to the average pupil. The *doctrinaire* tells us that successions of chords should be heard by the mental ear as they are being written down. So they should, but pupils have, as a rule, a good many steps to take before such a plan is feasible. The connection between two common chords should first be shown. There are three possible cases which can arise, (*a*) when two notes of the first chord are continued in the second chord, (*b*) when one note is so continued, and (*c*) when no note is continued. These three cases should be studied in the order given, and with plenty of exercises, until the student realises what part-writing really means. If a plan on these lines is adopted we should have, when longer exercises are attempted, a compact series of chords instead of an erratic collection of notes which look as if they had been thrown out of a pepper-caster. The next stage is to attempt cadences, and here we may have a first attempt to gain melodious part-writing. It should be shown that, in a perfect cadence, for instance, the melody must either ascend or descend by step to the tonic, as other plans are by no means so grateful to the ear. This can be proved by experiment, and by this means the student's musical ear is cultivated. The chord which usually precedes the perfect cadence, the cadential six-four, may be tacked on to the progression previously studied, and again the ear of the pupil may be instructed. When so much of a musical section is thoroughly mastered the chords which are found in the earlier part of the section should present very little difficulty to an average student. What has just been said also applies to other kinds of cadences, but it is unnecessary to proceed any farther in this direction. The treatment which has been described with respect to common chords will also apply in the case of their inversions. The restrictions with respect to the "doubling" of one note or another sometimes presents a further

difficulty in the case of inverted triads. If the work has been thoroughly done there will be very little trouble in adding the dominant 7th to the knowledge previously acquired. As this book is intended to expound principles rather than to indicate processes, enough has been said on the subject of harmony. Suffice it to say that systematic plans such as have been described above will be more likely to stimulate the pupil's attention than the haphazard lack of system which is by far too common when the subject of harmony is being taught.

The memorising of the Italian words employed in music is usually very imperfectly done owing to the irksomeness of the task. If we eliminate those words which have to be memorised by pure mental adhesiveness unaided by any of the links and pegs which teachers find so useful, there remains a considerable number which, through the laws of association, need give little or no trouble to the student. Many Italian words can with a little trouble be connected with their English equivalents. Here are a few examples of what may be done in this way. *Amabile* at once suggests "amiable," *animato* is "animated," but here a word of warning must be given; many pupils and their teachers believe that *con anima* means "with animation." This is the exact opposite to what the composer intends, for *anima* means soul. *Arpeggio* suggests "harp," *celerità*—"celerity," *delicato*—"delicate," *espressione*—"expression," *forza*—"force," *giojoso*—"joyous" (although so much unlike in appearance the two words are almost identical in their pronunciation), *marziale*—"martial," *patetico*—"pathetic," *repetizione*—"repetition," *soave*—"suave," *vigoroso*—"vigorous." The English equivalents given above have been selected on account of their similarity in sound to the Italian words with which they are connected, but a synonymous word should be selected in some cases. For instance, we do not usually speak of a musical passage as being "suave." Teachers and their pupils who have a fair knowledge of French will find this language of use for memorising Italian musical terms. It is of importance to notice that some Italian words have an almost identical pronunciation with their French equivalents, although this is obscured by

differences of spelling. Here are some Italian words with their French equivalents which illustrate what has just been said. The Italian *a* has exactly the same meaning and pronunciation as its French equivalent *à*, whilst its derivatives *al*, *alla* can easily be associated with the French *à l'*, *à la*. *Amore*—*amour*, *ben*—*bien*, *calore*—*chaleur*, *da di*—*de*, *dolce*—*douce*, *due*—*deux*, *e*—*et* (although the spelling is quite different the pronunciation is the same), *fuoco*—*feu*, *largamente*—*largement*, *mano*—*main*, *martellato*—*martelé*, *meno*—*moins*, *morendo*—*mourir*, *non*—*non*, *parlando*—*parler*, *perdendosi*—*perdu*, *più* means “more,” and hence is a stumbling block to those who associate it with *peu*, *ritenuto*—*retenu* (*retenir*), *senza*—*sans*, *tempo*—*temps*, *troppo*—*trop*, *una*—*une*, *volante*—*volant*. Many more examples might be given, but the above will illustrate what may be done in that way. The value of Latin as an aid to the meaning of Italian words is very obvious, since one language is the direct successor of the other. Teachers and their pupils are strongly urged to master Italian pronunciation, which a little application will prove to be an easy task. Then we should not hear Italian given with English vowels, *vivace* reduced to two syllables, or *crecendo* turned into *crecendo*.

In only a very few instances can German musical terms be associated with English equivalents in the way described above, as *Antwort*—“answer,” *Ball*—“ball,” *egal*—“equal,” *energisch*—“energy,” *ernst*—“earnest,” *erst*—“first” (not a very close imitation, but suggestive enough), *festlich*—“festive,” *Feuer*—“fire,” *frisch*—“fresh” (lively), *Gesang*—“song,” *Harfe*—“harp,” *hart*—“hard,” *in*—“in,” *laut*—“loud,” *leicht*—“light,” *Marsch*—“march,” *naiv*—“naive,” *rechte*—“right,” *Skizze*—“sketch,” *Tanz*—“dance,” *und*—“and,” *vier*—“four.”

If the pupil has to experience what psychologists mean by pleasurable excitement when studying the piano, it is essential that sight-reading shall be constantly attended to. Whatever work the pupil is engaged in, it must be so arranged as to conduce to efficiency in this respect. It is to be regretted that sight-reading does not receive the attention which it ought to have, and hence the practising of far too many pupils is very



dreary and discouraging. One reason why sight-reading receives so little attention is that only a small number of marks are awarded to this subject in examinations. The object aimed at in such examinations is, for the most part, extreme precision in the performance of the music contained in the syllabus. The value of such precision is of great assistance as the setting up in the pupil's mind of a standard which can be applied to any music which is afterwards studied. But this may be carried too far, when performances such as have been described are of no more value than the parrot-like recitations of long pieces of poetry by young children. Such recitations are of value in many ways, but they should not be allowed to usurp the time which ought to be devoted to the study of English. A girl, an advanced student, gets the music prescribed for one of the most difficult local examinations, which she practises for any length of time extending from six to fifteen months. Readers may question whether so long a period as fifteen months is occupied in direct preparation for such an examination, but it is by no means unknown. The examination is passed, but what is gained? Very little indeed, and certainly nothing comparable to the time and labour involved. The candidate discards the examination music with disgust, and probably never looks at it again. Her intellect is stunted as the result of so much laborious grinding, and she fails lamentably when trying to read at sight. This is not a fancy picture, but represents the actual experience and observation of a teacher, and, with suitable modifications, covers a great variety of cases. [There are plenty of teachers who have a reputation for getting their pupils through difficult examinations, but the performances of these pupils in other directions are beneath contempt.] Hence a very large part of the labour involved in preparation for examinations by such teachers is, so far as any permanent result is concerned, absolutely thrown away. If a large number of marks were awarded for sight-reading, say at least one-third of the total, the candidates who succeeded in passing the examination would be possessed of something which would be of value in any music which they might afterwards attempt. The parrot-like

performances at present required, however much skill is displayed, are of very little permanent value. Only in those cases where teachers insist upon a good deal of sight-reading can the evils of the system of examinations at present in vogue be avoided.

It will be of interest to enquire what are the conditions which go to make up good sight-reading. A "train of symbols," depicted on a sheet of music, passes in an orderly manner through the eye to the mind. There they are transmuted into directions, through the efferent nerves, to certain muscles to contract, when the fingers, one or more, press the keys to which they are assigned. Imperfect sight-reading implies that one or other of these operations is impeded through lack of either knowledge or skill. The train of symbols may not be received in the mind in an orderly way. Certain of the symbols may be disregarded or even misunderstood. The ability to group the symbols mentally may be entirely lacking, or at any rate very feeble. As a consequence of one or other of these faults the fingers are not employed in their proper order, or they take the wrong notes. As a first requisite for gaining the power to read well at sight, a very few conditions, which will now be specified, need to be observed. The letter-names of the notes are usually a hindrance rather than a help, hence they must be ignored. Instead of this certain positions on the piano must always be associated with the corresponding positions on the stave. When it is obvious that the hand has to move a considerable distance to right or left, this must be done instantly and boldly without any preliminary investigation as to the letter-name of the note which has to be struck. Such an investigation is always rather a hindrance than a help. It is astonishing how soon the movement of the hand and arm just described tends to become secondarily automatic, and how seldom an error is made. As a rule when the letter-name receives the first attention the position of the note on the keyboard is very indistinctly apprehended. The relative distances of notes not too far apart, and the fingers which are best suited to them must be associated. "Fingering" which is printed over the notes is a "good servant but a bad master." A slavish following of such fingering is

absolutely fatal to good sight-reading. The student is advised to get some well-fingered copies which should be thoroughly studied. After this process the printed fingering should be entirely disregarded if a satisfactory performance is to be obtained. There are certain principles which underlie all good fingering, and with these the student should acquaint himself. For instance, all passages of single notes are either scales or arpeggios. If there is any departure from the usual way of fingering such passages a reason should be sought for, and can be found by the earnest student. One investigation such as has just been described is of far more value than the slavish following of the fingering of a score of pieces. It is also most undesirable that only one plan of fingering a passage shall be mastered by the student, as a slight accident in performance may prove disconcerting and even disastrous.

The interpretation of time-symbols is probably the greatest stumbling-block of the average student. A knowledge of the time names of notes is absolutely of no service in sight-reading. Even a knowledge of their relative values, and the meaning of the groups in which they are found, is not always very helpful. If, for instance, we have a succession of notes which are alternately long and short, the disproportion between their lengths is far too frequently not shown clearly and accurately. A familiar example of this is the succession of a dotted quaver and semiquaver, of which the former note must be three times as long as the latter. This difference cannot be got until the pupil realises that the semiquaver must be instantly succeeded by the following long note, and that the fingers must prepare for this rapid movement. When the long note is struck the pupil must wait a considerable time before the following semiquaver is attacked. Several attempts will be required before this alternation is mastered, and the pupil will be materially helped by one or two practical illustrations on the part of the teacher. The stern padagogue will say that this is pandering to the idleness of the pupil, and that the proper method of playing the succession of notes under consideration should be evolved by intellectual means. Such is too frequently



the attitude of the teacher. In reply it may be contended that the aim of the teacher is to get a certain thing done as expeditiously as possible, provided the pupil understands the process which is employed. There are plenty of problems to be faced in the future, so why waste time unnecessarily? What has been said applies to many other combinations of time-names, but the principles involved in their mastery are the same as those propounded above.

The first requisites for the attainment of sight-reading power have been indicated, and we must now turn to those operations which are carried out by means of the efferent nerves. A certain finger must strike a specified note which must be held for a definite time and then released. This, multiplied a thousand-fold, constitutes the whole art of the pianist so far as mechanical skill is concerned. When successions of notes follow each other in the same way very frequently, the Law of Contiguity associates the requisite muscular movements in such a manner that each one suggests that which follows. By this means certain habits of fingering are gained. Successions of notes which at first required close attention on the part of the student can afterwards, as the result of many repetitions, be performed with ease and certainty. The labour prescribed for the attainment of such skill is known as technical practice. One word of warning must be offered to the teacher. Always remember that practising of the kind just described is a means to an end. How frequently is it regarded as being the end itself! Another point which is too frequently disregarded is that a large amount of technical practice can be obtained from pieces of music. If these pieces are of an attractive character the pupil is impelled to practise them more thoroughly than if the difficult passages which they contain had been found in a book of technical exercises. In the latter case they would probably have been treated in a perfunctory manner, and this is a fatal bar to any progress. No specified plan of practising will be displayed here. Suffice it to say that any plan which rouses the intelligence of the pupil cannot be wrong. The teacher who has evolved certain nostrums from his observation and experience

is quite justified in praising them if he has found them successful, but he must not also infer from this that the plans of other teachers are "all wrong." Yet there are plenty of teachers who take this line, even if they do not make any dogmatic assertions on the subject. The position of the hand and wrist is very important, but that which is favoured by any particular teacher is probably neither better nor worse than those which are adopted by a score of other teachers, who may again differ from each other.

We have traced the sequence of operations which are necessary for the performance of a piece of music. These were, first, the reception of the symbols from the printed page into the mind, and, secondly, the transmission of the impressions produced through the efferent nerves to the muscles by which the fingers are actuated to press the keys of the instrument. In some cases the first of these steps is unnecessary, as, for instance, when the performer is reproducing something which has been memorised, or when extemporising. Both these cases require what we call Reproductive Imagination. This is obviously the case when a definite piece of music is performed, and many persons who have great skill in playing from memory do actually have a mental picture, called by psychologists an Image, of the music they are performing in the mind. Another kind of image which is of assistance when memorising is the power of mentally hearing the music to be performed. Sometimes the succession of muscular impulses, especially in difficult passages, is of service when practised in such a way as to form an image. The union of the above kinds of image so as to form one image which is complicated in a corresponding degree is what should be aimed for by all who wish to play from memory. Concepts which relate to chords, their constitution and usual succession, will be found of great assistance. The same remark applies to an observation of the course of modulation and the sequence of melodies. Also, on the side of mechanical skill, to general plans of fingering and the exceptions which are met with. In extemporising the employment of the Reproductive Imagination is, at a first glance, by no means so obvious as when playing a

given piece of music from memory. In the latter case we are largely concerned with a series of concepts which are derived from one source, but in the former we display reminiscences drawn from a thousand sources. However much we may admire the extemporising of a great artist it is a mistake to assume that it is, except in a very partial degree, evolved from his inner consciousness. Even his melodies must be more or less reminiscent of what he has heard, and the same remark applies to successions of chords. Doubtless our great composers have made discoveries, sometimes through lucky accidents, when they have been extemporising. When we read of Beethoven sitting at the piano for an hour or more, and during that time gradually building up a movement of a sonata, we can easily imagine that something new will be evolved, and that even the accident of his hand falling in a wrong place on the keyboard may suggest some previously unheard succession of harmonies. In the case of the average organist the whole of his extemporising is evolved from his previous experience, and in far too many instances he moves within a very small and oft traversed circuit. His affection for the chord of the diminished 7th is only equalled by his preference for descending chromatic progressions of the bass. He may have a vague notion of the development of themes, but never employs such a device in his extemporising.

It has been stated in the preceding paragraph that a performer, when extemporising, unconsciously avails himself of an accumulation of melodic and harmonic devices which he has previously stored in his mind; in other words, he makes extensive use of his Reproductive Imagination. But besides this there should be, if really interesting results are desired, the exercise of another faculty which we call the Productive Imagination. By this means the material which was previously accumulated in the mind becomes modified. Such modifications are implied in any assertions as to the individuality or the idiosyncrasy of a musician. What has just been stated applies in a still more emphatic manner to the work of the composer. But we can find abundant use for both the Reproductive and the Productive Imagination in the case of performers of all grades. A stolid



following of a train of symbols in a piece of music is to be deprecated at all times. Instead of this, the pupil should, through the agency of previously acquired concepts, reduce the amount of labour demanded either in sight-reading or at other times. The slightest indications on the page should lead to inferences which can take the place of a laborious observation of a series of symbols. This is done in the case of an expert performer, and should, therefore, be regarded as lying within the range of the most elementary pupils. More detailed reference to this matter will be found in the next Chapter. Skilful transposition implies a large employment of both the kinds of imagination to which reference has been made. "Playing by ear" and from memory were emphatically condemned by the old-fashioned music-master, but they should find a place in any up-to-date curriculum. This kind of study trains the pupil to anticipate the sounds of a piece of music, which can, in consequence, be played with expression. In other words, the Reproductive Imagination is employed extensively, and this will, in the case of a pupil who is musically gifted, lead to the development of the Productive Imagination.

The next stage in the operations which go to make up a musical performance is the reception of the sounds produced through the ear. Except in the case of those who are afflicted with deafness, this part of a musical performance is the necessary consequence of those which have gone before. There are, of course, many ways of listening to music, and they may be classed under the heads of "perception" and "apperception." Where special attention is not drawn to the subject we have the passive form known as perception. As a consequence we have pupils, in other respects good players, who cannot detect their own errors. Some never realise that they are producing a very bad tone or that they are playing loudly when there is the direction *pp*. It is to be regretted that what has just been said applies to a very large number of pupils and even to some teachers. If really artistic results are to be attained the easy-going inert "perception" must be discarded for the active and keen mental operation known as "apperception." How to

stimulate this faculty is one of the problems which the earnest teacher must always have in view. Suggestions for this purpose would be out of place here, because so much depends upon the "personal equation" of both teacher and pupil.

We have seen in a generalised form the kind of material with which the pupil must be supplied by his teacher. The pupil carries away with him what may be termed a mental packet containing a suitable selection of theoretical and practical information which ought to be absorbed into his intellect before the time set apart for the next music-lesson. This necessitates what is known as "practising." A fair definition of a very large portion of the practising which goes on all over the country is "A systematic plan by which a large amount of time is absolutely wasted." All teachers will agree that this is by no means an exaggeration. The average pupil opens the piece or study and plays with greater or less fluency to the place where the teacher has placed his usual sign to mark the end of the lesson. The pupil then turns back and repeats the process one or more times, and little or nothing has been learned. At any rate there has been a maximum of time spent with a minimum of result gained. Pianoforte practice is by no means the only kind of study which displays this waste of time. The average girl trying to learn an irregular French verb displays a similar kind of ineffectiveness.

It seems a truism to say that a pupil when practising should have a definite object in his mind. Yet there are thousands of pupils who have never heard that such a thing is either necessary—or unnecessary. To obtain the best result when practising, definite thought must be given to every note that is played. If the attention is allowed to stray, even momentarily, from the work which is prescribed to be done, by so much is the time of the pupil wasted. Not only so, but a habit of inattention will soon be set up which is fatal to really good playing. The writer has known many clever and intelligent girls who might have become really good players, but, owing to their own conceit and the flattery of friends, they failed to fulfil their earlier promise. At last they were, practically, unable to do really good work even

when they earnestly desired to do so. Young music-teachers who are really talented continue to make progress so long as they realise that they have more to learn than they have already acquired. When they forget this and display a large amount of self conceit, as a great many do, their progress is at once arrested, and they are almost certain to deteriorate. What has just been said applies with equal force to all kinds of students.

Because the pupil should see and apprehend every symbol it is very essential that a habit of slow playing should be cultivated. It is a curious thing that there is no more severe test of real musicianship than the ability to play slowly. Slow playing, by giving time for the muscles to be properly controlled, prevents that repetition of notes and chords which is a kind of musical stammering. All notes must be found by the touch and the muscular sense, whilst the eyes must be restricted to their proper work of following the symbols which are found in the copy. There are exceptions to this rule, but they ought to be very few and far between. In the practising of scales and arpeggios no exceptions should be permitted. If an error is committed, such as the striking of a wrong note, do not stay to correct it, but memorise the place where it occurs so that it may receive attention afterwards. The plan of stopping a pupil's performance when an error occurs, and asking for its correction, is, as a rule, the greatest waste of time, because the mental impression produced by this interruption is too faint to leave the slightest trace in the mind. Or if there is a faint mental trace it is obliterated by the attention which has to be devoted to the subsequent bars. Sometimes the music is too complicated even when taken very slowly. When such is the case there is only one resource open to the student—the hands must practise their parts separately. There are actually teachers who condemn this plan, which they would scorn to employ with their pupils. They loftily say that "such a plan is a great waste of time." By this they mean that the time occupied in playing a page, first with the right hand and then with the left hand, is greater than that occupied if both hands



were employed together instead of separately. It may be questioned if this estimate of the actual time expended is true in all cases, or in a considerable proportion of them. Even if it were true we may place on the other side the greater pleasure of the pupil in being able to pass through bar after bar, understanding all that is played, as compared with the dull and confused feeling which is the necessary result of attempting what proves to be too difficult a task. If the pupil has tried to follow the hints just given, the next lesson will be pleasant for both teacher and pupil.

The principles which have been enunciated are applicable to other instruments as well as to the piano, due regard being had to the differences of technique and musical idiom which they will display. Any details of discussion of their peculiarities is therefore unnecessary here, but before closing this chapter a few remarks must be made with respect to solo singing as usually taught. If sight-reading is a weak point in the education of pianoforte students, this is still more the case with vocalists. We should all agree that inability to read music at sight with ease and facility is a great deficiency so far as performers on the piano are concerned, but there appears to be a sort of fatalistic feeling that such skill is beyond the power of the average singer. How can this difference be accounted for? In at least two ways. Up to within a very recent period the "fixed *do*" was almost invariably used by the orthodox singing-master. That plan has one great merit. When rightly used it conduces to the production of pure vowels. So far as sight-reading is concerned the fixed *do* plan is a hindrance rather than a help. There may be gifted individuals who become good sight-readers through the use of this system, but they are very rare. Even with that very interesting but complicated system of inflected vowels for the purpose of indicating sharps and flats, which was devised by the late Professor Hullah, the results obtained are quite incommensurate with the efforts required. On the other hand, if the "movable *do*" is employed, or any other system which has for its chief feature the indication of key relationship, efficient sight-reading can always be acquired

except in the case of persons, if such there are, who are devoid of musical perception. Even in the case of those who cannot imitate a given sound, very striking results have been obtained through the persistent employment of the movable *do*. In such cases the note which the pupil always produces when asked to sing must be identified and regarded as the tonic of a scale. This will be called "*do*," and adjoining notes of the scale will be added. A pictorial representation of the scale, such as a Tonic Sol-fa Modulator, is of service for assisting the mind to acquire the requisite concepts of pitch. When these difficulties are overcome the following steps may be taken successively if great care and perseverance are exercised. In the case of pupils whose musical faculties are more developed than those just described these steps will present very little difficulty. When the notes of the scale can be sung in varied order their application to the stave forms the next step. The mental placing of the Sol-fa names on the lines and in the spaces of the stave is not a formidable task, even when we consider that these names have to be removed to higher or lower positions of the stave with each change of key-signature, and whenever there is a distinct modulation. As soon as this stage is reached the pupil will unerringly give the correct pitch of any note if its Sol-fa name is employed. When still greater facility is gained the Sol-fa names will rise into consciousness in the mind as the result of following the symbols on the paper, and these names may then be abandoned except when there is some particularly difficult passage which requires special study. Besides the employment of the fixed *do*, there is another reason why the usual singing lessons do not conduce to good sight-reading. When an exercise in Concone, or other writer of *Solfeggi*, is taken the teacher sings along with his pupil. The same plan is employed when a new song has to be studied. It will be conceded that such a plan does not conduce to the mental development of the pupil. Also the stentorian tones of the teacher must tend to confuse the average pupil who tries to follow and imitate them. No serious attempt at reading the notes of the song or exercise which is being studied can be made

under such circumstances. Is there any other class of teacher who leads a chorus of pupils in their work? Does the teacher of the alphabet say the successive letters in a sing-song style in which the members of the class must join? Does the teacher of the multiplication table recite its various numbers along with the class? When passing an ordinary day school some years ago one might perchance hear a spelling lesson in which the children said over and over again the letters of a particular word, as for instance b - a - d—bad, with a rising inflection on the third letter. This plan is by no means of an educational character, but even then there was not the added absurdity of the teacher's voice leading the class. If repetition along with pupils in the cases mentioned is unsatisfactory it is equally so when teaching singing. After the singing lesson the pupil goes home and picks out the notes of the song or exercise on the piano. It is obvious that sight-reading is not encouraged by such means. Pupils should always try to read their songs at sight. If they make up their minds to try they are frequently astonished at the very few false notes which they sing.

A few words as to the treatment of those who sing what a schoolmaster once called the "drum" part in a class will be found of service by many teachers. Monotonous performers of this type are very rare in singing classes which are composed of girls, but with boys they are by no means uncommon. The writer has had a class of about twenty boys of whom at least five sang only one note, and all their notes differed in pitch. It is also a striking fact that this monotone was in each case louder than the average boy's voice. The effect upon the teacher's ears can be more easily imagined than described. So distressing was the effect of the singing of the whole class that he was compelled to silence those errant boys whilst exercises were sung by the others. Every now and then, out of sympathy with the feelings of the boys who were silenced, the teacher allowed them again to use their voices, when the effect was most painful. Yet all those boys sang in tune before the end of the term. Taking the worst case the teacher assumed the boy's one note to be "*do*," and tried to get



him to take the next note higher in the scale. The other boys sang the required notes to him, which he tried to imitate, and after much perseverance he was successful. It is important to bear in mind that any pattern set by the teacher's voice cannot be imitated by very backward pupils such as those under consideration. This difficulty arises from the fact that the teacher's voice is an octave lower than those of the pupils. A very different result is shown when the required note is sung by the other members of the class. There is also the additional advantage that all those who take part in operations such as those just described gain an increased interest in their work—in other words, their attention is stimulated. Higher notes were got by suggesting to the backward pupil that he should sing "like a girl." There is nothing the average boy resents sooner than being compared to a girl. Another plan to get the higher notes was to suggest that he should imagine himself to be calling to someone at a greater distance than usual, as, for example, at the other end of the football field. One very curious observation was made by the teacher which is worthy of notice. When the class sang long notes to the vowel *ah* the "drones" were present in full blast, but when the vowel *oo* was substituted every voice was in tune. The reason appears to be that long usage of *ah* had confirmed the bad habit, but that the unaccustomed vowel *oo* came fresh to the minds of the boys. In the same way common words are a greater stumbling-block to stammerers than those which are rarely used. Also if the end of one word is joined on to the beginning of the next, as, for example, toot-ell instead of "to tell," stammering can be frequently avoided. The reason for this is that the words are taken in an unaccustomed manner.

A very great deal is said nowadays about "voice production." As the writer has not any peculiar theory to propound he feels that he may safely venture to say a few words on this very controversial subject without danger of bringing a hornet's nest about his ears. There appears to be a tendency to separate the cultivation of voice production from that of singing, but is there any benefit in divorcing two things which should be intimately

connected? Every teacher of singing who is thoroughly qualified for his work must be master of voice production, at any rate we will assume that to be the case in the remarks which follow. The only safe test of correct voice production is its effect upon the ear of the teacher. If the notes produced by the pupil are smooth and pure in quality there cannot be anything wrong in the manner in which the voice is produced. Another condition is that every vowel must be available so that the words of a song shall be clearly pronounced. Some vowels are more difficult to produce than others, and it is a part of the teacher's duty to modify this peculiarity as much as possible. It is worthy of notice that vowels which one pupil produces with ease are difficult for another pupil, in fact no two voices are alike in this respect. If there is a very distinct break in the voice that is strong evidence of previous misuse. Infant prodigies who perform at numerous Tea-parties and Band of Hope meetings are frequent victims, with the result that what might have been a promising career, if the child had not been prematurely pushed forward, is replaced by disappointment and disgust. The talent which must have been possessed by such singers is thrown away. Many voice trainers do not distinguish between voices which are naturally strong and those which never can be made powerful without also becoming harsh. A girl who is blessed with a powerful but untrained voice of good quality is marked out for a public singer if she has the requisite intelligence and perseverance. Voice trainers who have such pupils to train get into the habit of insisting upon a large volume of tone from less gifted singers. The result is, almost inevitably, a harsh tone and certain constricted positions of the throat which give rise to peculiar clicks and other unnecessary sounds. A voice which is faulty in this way cannot be restored to a natural condition without an enormous amount of study and perseverance. The average girl does not expect to sing in any larger place than the drawing-room at home. Why then should her voice be trained as if she would have to fill a large public hall? Such misuse of the voice is the height of folly on the part of the teacher, and it is far too common even with voice trainers of repute. A voice

which will fill a drawing-room with pleasant tone would be quite ineffective in a concert-room. On the other hand, the powerful voice of an effective public singer usually sounds very harsh in a small room. There is no compatibility between the two sets of conditions, and hence that plan should be adopted which seems best to suit the circumstances in each case.



## CHAPTER VI.

## SOME USEFUL CONCEPTS.

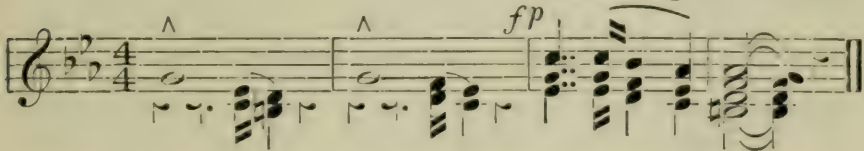
IN the previous chapter it was stated that sight-reading results from the interpretation of a train of symbols usually printed on a sheet of music, which pass in an orderly manner into the mind, are there interpreted and, through the efferent nerves, this interpretation directs certain muscles to contract. It will be convenient in this further investigation to confine our attention very largely to the piano, as was done in the previous chapter. In the case of the elementary pupil each symbol is separately interpreted, and the requisite muscular motions called for, obviously a very slow process. As time goes on certain frequent successions are observed, and are connected in the mind by the Law of Contiguity. As examples of this it is sufficient to name scales and arpeggios. As experience is gained the whole of the notes in a given scale or arpeggio are included in one comprehensive glance, and these successive notes can be played at a high rate of speed if the requisite technical skill has been acquired. Because of this rapidity, both of apprehension and of performance, some psychologists assume that very few of the symbols which are found on the page of music reach the mind, but that the movements of the muscles, which through practice have become "secondarily automatic," do not require the slightest intelligent direction. It is not of any great importance whether we adopt the view that each muscular contraction prompts that which follows through the definite action of the brain, or whether such action is unnecessary, although to the present writer the latter view seems to be the greatest nonsense. Of course we all know that we are unconscious of any minute action of the mind when playing

rapid passages on the piano, but that is no proof that such action is absent.

The desire to recognise, with ease and rapidity, successions of notes such as have just been referred to requires the formation of certain "concepts." The selection of the most useful concepts for this purpose is one measure of the teacher's skill and experience. The remarks on this subject which follow are offered as suggestions only, and by no means as dogmatic statements. Every teacher who has bestowed some thought on this topic will have formulated certain plans which he knows are at least as useful to him as any of the hints which follow. Still it is equally true that those who have become the most skilful in this way will be amongst those who most readily consider the hints of another teacher. It is only the ignorant and inexperienced who, in their own minds, are conscious that their knowledge is most profound, and that no hints can be of value to them. It is a great and important truth that "the more we know the less we find we know."

As "time" is the most difficult subject which we have to impart to pupils it seems desirable that we should commence with that topic. In the case of new pupils of about 15 or 16 years of age who are not good sight-readers the writer almost invariably gives them a book of Heller's Studies. The first of these Studies commences as follows:—

HELLER, Op. 47, No. 20.



After determining that the pupil must count "four in a bar," the question is asked "Can you show me where you will say 'three' in the first bar?" Out of hundreds of cases there has never been but one correct answer, and that is, "I don't know." Any attempt to point out the correct place has invariably been wrong. Of course something is due to nervousness and consequent confusion in the presence of a new teacher, but even

when shown the way in which to picture out a bar a great many fail to grasp the idea. They wish to add up the notes so as to obtain their total value, and cannot realise that a single semiquaver followed by a crotchet, as shown in the extract, is never on the beat. They can demonstrate the fact for themselves afterwards, but for the purposes of their lesson they must accept implicitly the statement that the semiquaver comes at "a quarter to three," and hence is never "counted." Also that a mental picture must be formed in the mind so that the same difficulty may not occur either in the remainder of the Study or in any other composition which contains the same or an analogous combination.

The concept which we have now to consider includes all that we mean by the term "grouping." This term is primarily applied to successions of such notes as quavers, for example, when their stems are joined together by means of a continuous band. Such successions of notes may well form the introduction to our more comprehensive study of the term. That this very elementary form of grouping does not receive the attention which it ought to do will be evident from the following example, which represents the writer's experience with a large majority of pupils who are not so far advanced as those previously described.

BERTINI, Op. 137, No. 1.



After deciding that the pupil must count "four in the bar," the question is asked "Without adding up the notes can you point out the position of 'three' in the first bar?" Very rarely indeed can this be done. The pupil has never been shown that quavers are grouped, and consequently that as there are two groups in the first bar, each group representing half-a-bar, we



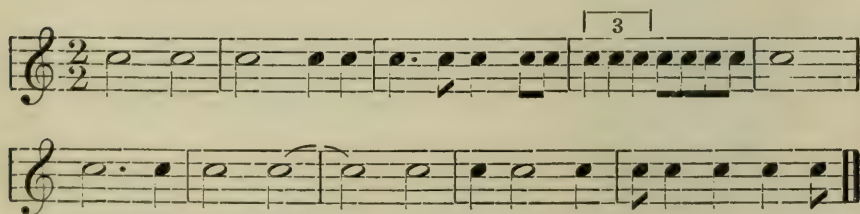
must say "three" at the beginning of the second group. Working backwards and forwards from "three" we obtain "two" and "four." When the grouping of the first bar is thoroughly grasped the three bars which follow are quite easy, but the fifth bar presents a new difficulty. Very few pupils count this bar correctly at a first attempt, because they fail to sustain the crotchet. By identifying "three" and working backwards they realise that the first note of the small group is "two," and that the crotchet must represent in length the first two quavers of the previous bars. Perhaps some teachers may suggest that the difficulties just described would have been met by the employment of the word "and" after each number. Such a device might do very well if we never had any further subdivisions of the beat than halves. When we came to insert "and" into the middle of a group of semiquavers we should find that we had only complicated matters instead of simplifying them. The employment of "and" is a weak device which is beneath the notice of any conscientious teacher. Readers must not suppose for a moment that pupils such as are described above are exceptionally stupid; they are only the victims of imperfect tuition.

By "group," then, we understand a subdivision of a bar, whether the stems of the notes contained in that subdivision are joined or not. The simplest form of such a subdivision is that which occurs in "duple" time, and the few examples which follow will illustrate what can be said on this subject.



In the first four bars the grouping is quite obvious and straightforward. The only difficulty which the teacher might experience is in inducing the pupil to sustain the longer notes. This cannot, as a rule, be so well done by counting as by a mental measuring

of these longer notes by reference to the adjoining shorter notes. Whilst pressing down a longer note the pupil should, in imagination, play as many of the shorter notes as go to make up this longer note. In the fifth and sixth bars we have examples of the manner in which a note may extend beyond the limits of a group. Pupils find it difficult to realise that the termination of such a note must coincide with the limits of a group, or if it should finish a little earlier one or more notes or rests must be employed to make up the group. In the bars under consideration we see that a minim occupies the time of two groups, whilst a dotted crotchet extends half-way through the second group, and demands one or more notes or rests for its completion. The last four bars illustrate various forms of syncopation. The manner in which such forms interfere with the natural grouping of the bars must be thoroughly grasped by the pupil if a satisfactory performance is desired. If the principles enunciated above are thoroughly grasped it will be seen that both  $\frac{3}{4}$  and  $\frac{4}{4}$  time can be obtained by adding one or two groups to each bar. In fact no teacher should be satisfied until his or her pupil can instantly show where the second half of a bar in  $\frac{4}{4}$  time commences. That the grouping shown above is not really difficult to grasp is very obvious. This is owing to the fact that so many notes are grouped by means of continuous bands. If we now double the length of each note, as in the following example, we shall see that the pupil's task is by no means as easy as before.



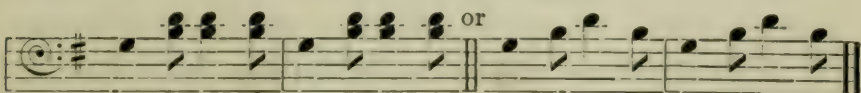
Here we see that the identification of the groups demands the intelligent apprehension of the mind. It is absolutely necessary that a picture shall be formed in the pupil's mind of every form of bar in the above extract. Any uncertainty in this respect is

fatal to good sight-reading. Studious pupils do acquire the power of subdividing a bar, as suggested above, but it is very rarely that the subject is presented systematically in their lessons. One very useful and pleasant means of gaining this power is the working of a varied series of written exercises on the subject.

To complete our investigation it will be necessary to examine the groupings which are distinctive of compound time. These are usually found to be more difficult to grasp than those which belong to simple time. The following examples have been obtained by the transformation of those which are given on p. 85.



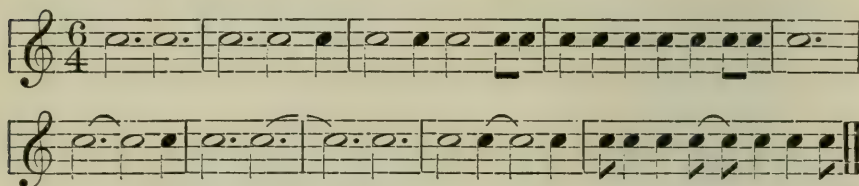
The essential feature of compound time is that each group consists of a dotted note, and that in any subdivision into two parts, the first part is almost invariably twice as long as the second. This is clearly shown in the first three bars. Yet there are thousands of pupils who never recognise the peculiar limping movement of the accompanying left hand part in  $\frac{6}{8}$  time when we have the very common succession



One of the chief reasons for this lack of apprehension is that pupils generally count "six in the bar" instead of two. The sixth bar in the above example is of interest as showing that a note which has the length of a group and a fraction of another group requires two symbols which are connected by means of a tie. A note which is of the length of two groups can be represented by one symbol. This is shown in the fifth bar of the example. We can obtain  $\frac{9}{8}$  or  $\frac{12}{8}$  time by the addition of one or two groups to the above examples. Pupils generally find



$\frac{12}{8}$  time very perplexing owing to the great length of the bar. When such is the case they should mark the limits of the groups lightly in pencil. The difficulties found in identifying the groups in the example of compound time which is given on p. 87 are much increased if we double the value of each note. This is analogous with what was said with respect to simple time, but the sources of perplexity are even greater, as the following example will show.



The grouping in most of the bars should now be quite clear. It is of interest to notice that it is impossible to decide whether the fourth bar is in  $\frac{3}{2}$  or in  $\frac{6}{4}$  time until the context has been examined.

There are certain cases in which the fractional value of different time-signatures is identical. These are  $\frac{3}{4}$ ,  $\frac{6}{8}$ , and  $\frac{12}{16}$  time, and  $\frac{3}{2}$ ,  $\frac{6}{4}$ , and  $\frac{12}{8}$  time. An exercise which is founded on these peculiarities has sometimes been set by the author with satisfactory results. It runs as follows—"At the commencement of three successive staves write, respectively, the signatures  $\frac{3}{4}$ ,  $\frac{6}{8}$ ,  $\frac{12}{16}$ . After each signature write 12 bars. The first bar must contain one note, the second two notes, the third three notes, and so on. Rests must not be employed." No more severe exercise can be devised than this. Any student who can pass through this ordeal successfully need fear no rhythmical combinations however complicated, whether they occur in actual performance or in an advanced examination paper. The signatures  $\frac{3}{4}$ ,  $\frac{6}{8}$ , and  $\frac{12}{16}$  should also be treated in the manner described above.

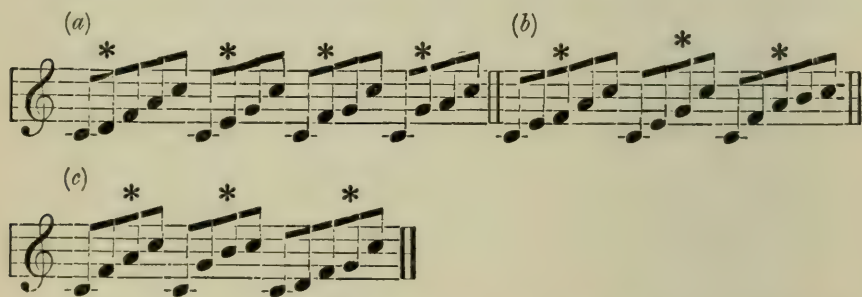
The most comprehensive concept which has relation to the pitch of notes is most conveniently represented in the mind by the word "interval." Under this general concept we shall be able to formulate several partial concepts, as was done in the case of "group" in the previous paragraphs. It will be

convenient to consider "fingering" in its relation to intervals throughout the whole of the investigation which follows. Their separation is one of the most frequent faults in teaching. As soon as the pupil can find one note a finger should be assigned to it. When another note is found the distance between that and the first note determines which pairs of fingers may be selected. The apparent automatism of the expert performer's fingers depends exclusively upon the association of successive or combined notes with their appropriate fingering. One very striking evidence of this is shown by the manner in which many teachers determine the best fingering to be written on the pupil's piece. Instead of reasoning out the best fingering in a logical manner, they play over the passage, not necessarily on the keyboard, but on the lid of the piano. If the teacher is an expert performer the result, so far as the pupil is concerned, is quite satisfactory, as there will be nothing objectionable in the fingering. It is, however, much better to display to the pupil the reasons for the adoption of certain plans of fingering, as this will be useful not only for the piece then under consideration, but for any pieces which may follow. In the following pages, when speaking of the fingers to be employed, numbers corresponding to either the English or the Continental system will be avoided, such commonly understood expressions as "little finger," "forefinger," "ring finger," "long finger" being substituted.

The first interval which must engage our attention is the "octave." Its importance is evident from the fact that the span of an octave with the thumb and little finger represents the greatest distance which is ordinarily expected from a performer. Wider spans than this are within the powers of some performers, but they must be regarded as quite exceptional, and so will be disregarded in what follows. The immediate recognition of the notes on a sheet of music which form an octave is a feat which is of the utmost importance for the attainment of good sight-reading. Yet it is a fact that a very small minority of pupils, perhaps not more than one in a hundred, know that one of the notes which form an octave is

“on a line,” whilst the other is “in a space,” and that there are two clear staff-lines between these notes.

Let us now place the thumb and little finger of the right hand on two notes which form an octave. For convenience we will assume that the name of these notes is C, but any other letter-name might have been employed. With the hand in this position it will be observed that there are six white notes included within the octave, and that these have to be commanded by three fingers. The black notes will be disregarded in this investigation, but it is evident that what follows may easily be applied to them. (a) The forefinger commands D, E, F, and exceptionally G, (b) the long finger commands F, G, and exceptionally A, (c) the ring finger commands A, B, and exceptionally G. Observe that the note assigned to any of these fingers in this and the succeeding examples is indicated by an asterisk.



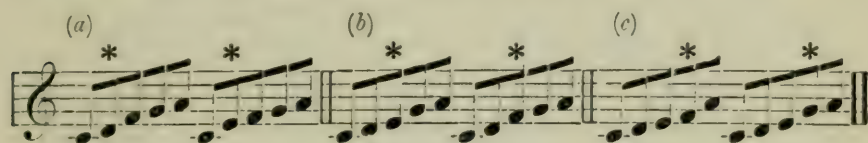
The above examples are given in the form of arpeggios for the sake of clearness, but it is obvious that most of them may be treated as chords. It is unnecessary to give examples for the left hand as they may be deduced from what has just been stated.

The hand, when in the position just described, commands about one-sixth of the keyboard. Let us now remove the little finger from C to B whilst the thumb retains its normal position. There are now five intermediate notes which have to be assigned to three fingers—(a) the forefinger will take D, E, and F, (b) the long finger will take E, F, and G, and (c) the ring finger will take G and A.





If the little finger be now removed to A we have four intermediate notes which will be treated as follows—(a) the forefinger will take D and E, (b) the long finger will take E and F, and (c) the ring finger will take F and G.



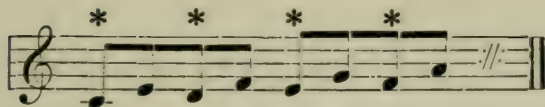
With the thumb on C, whilst the little finger is on C, B, or A, we have what is known as an “extended position” of the hand. The examples given above show exhaustively what is within the powers of the fingers when the hand is placed in any of these extended positions. A very few other illustrations could have been devised, but they are not included because they have no practical value, as not being within the powers of the average human hand. If we place the little finger on G we have what is known as a “five-finger” position, in which each finger commands one note. Such an arrangement is known as the “natural position” of the hand, but it is quite unnecessary to give any illustrations here.

Whilst still retaining the thumb on C, if we now place the little finger on F we have what is known as a “contracted position” of the hand. The thumb and forefinger are now both on, or over C, whilst the remaining fingers command D and E. If now we move the little finger to E the long finger covers the thumb which is, in fact, quite concealed. It is, of course, possible to pass the thumb still further under the hand so that it is covered by the ring finger and even the little finger. Such

devices are, however, comparatively rare. A very few experiments will show that such positions as have been described are, in themselves, very awkward and clumsy, and that no one would employ them where the natural position of the hand was equally available. They are, however, of the utmost value for passing easily and smoothly from one part of the piano to another. It would, in fact, be most difficult, if not impossible, to perform many of the sequential passages which are so frequently found in pianoforte music without the aid of such contracted positions of the hand as have been described. In the following examples the position of the thumb is shown by an asterisk; in (a) it passes under the forefinger, in (b) under the long finger, and in (c) under the ring finger. Each example can be played either forwards or backwards.



It is obvious, from the last example, that ordinary scales require the thumb to be placed momentarily under one or other of the fingers. A moment's consideration will show that such is the case when playing arpeggios. The thumb is of the greatest assistance when playing examples of the kinds shown above. This is owing to the fact that it moves easily at right angles to the normal action of the fingers. There are, however, a few cases in which the use of the thumb is discarded, and where the forefinger or the ring finger passes under its longer neighbour. Parenthetically it may be remarked that, on an emergency, a shorter finger may always pass under a longer finger, or *vice versâ*. The following example shows the manner in which the forefinger and the ring finger are placed under the long finger. The reason why these fingers work together so well is because they are of about the same length.



The notes taken by the forefinger are shown by an asterisk. When performed as written the forefinger passes under the long finger, but when played backwards the ring finger occupies that position. When playing scales in double 3rds we have examples of the thumb passing under the fingers, and of shorter fingers passing under longer fingers, and *vice versa*. The examples given above are sufficiently extensive to illustrate the various positions of the hand. All these examples can be adapted to the left hand by reversing every position. Thus any example when played backwards with the left hand has exactly the same fingering as when played forwards with the right hand, and *vice versa*. Readers who wish to pursue further investigations on this head are referred to the author's "Exercises, Scales, and Arpeggios" (Curwen).

It was stated on p. 89 that the interval of an octave represents what is understood to be the normal span of the thumb and the little finger. A very great deal of what we may term the natural idiom of the piano is founded on this phenomenon. It is, in fact, a disadvantage when passing gradually from one part of the keyboard to another to try to reach further than an octave in one span. The treatment of chords in the left hand which extend to the distance of a 6th is an illustration of the importance which should be attached to the span of an octave. It is of the utmost importance that a uniform plan should be adopted for the treatment of such chords, and that the employment of the little finger should, as a rule, be avoided. All such chords should be fingered on the assumption that the little finger must be prepared to touch the octave to the note which is taken by the thumb. Even if it is known that the little finger will not be required this plan must not be abandoned. It is only by such uniform treatment that the necessary automatism in the finding of chords can be insured. Such uniformity is by no means common, with the result that pupils display



great uncertainty in the finding of chords. There are certain positions of chords which constantly recur in either one key or another. Where such combinations do not exceed a 4th in extent the little finger and the ring finger must on no consideration be employed. How frequently do we find this rule transgressed, with the result that the chord is found with difficulty. A favourite combination of this kind is that position of the dominant 7th which is given in the third group of the following example. This combination should be recognised in any key, and it should be always associated with its fingering. Where a chord extends to a 5th it is optional in some cases whether the ring finger shall be employed or not. In the first group of the following example this option is valueless, the reason being the construction of the second group. When the chord extends to a 6th the ring finger should be employed. This is illustrated in the second and fourth groups. Some of the greatest writers on the piano, such as Czerny, are most consistent in their employment of the plans from which the above rules are deduced, whilst other writers are more lax. Such laxity is not desirable because it hinders the training of the fingers to become secondarily automatic. Whatever combination of fingers is advocated it should be employed uniformly if a satisfactory result is to be obtained.



The above examples include a very great deal of what refers to the treatment of chords in the left hand. Taking them as a basis the same combinations in other keys may be studied, and from these again combinations which may be regarded as variants of the examples may be formulated without difficulty. The number of actual combinations of notes when the hand is spanning an octave is very limited. This is clearly shown by the examples on p. 90, which must be regarded as being exhaustive of the theory of fingering so far as the interval of an octave and its contents are concerned.

Other forms of broken chords which extend to an octave must follow the plans just discussed. In the following examples, which apply to both hands, we have first a complete chord, and then numerous combinations which are derived from this chord. In no case may any deviation from the fingering of the complete chord be permitted.

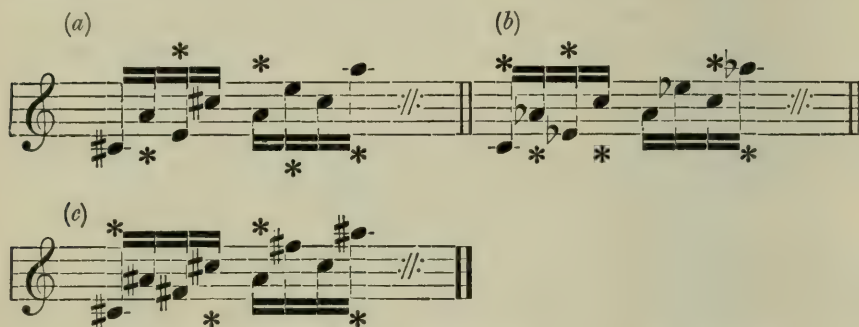


When playing a passage which consists of broken chords either ascending or descending for a greater or less distance it is almost invariably desirable to have successive positions which extend to an octave.



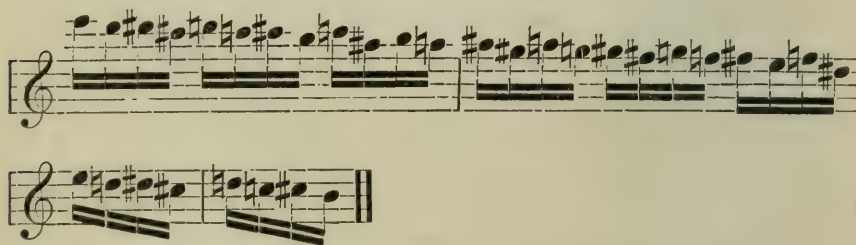
In this example the positions of the thumb in the right hand are shown by asterisks above the notes, whilst those for the left hand are placed below the notes. The example can be extended both upwards and downwards, and it can be played either forward or backward. The student should construct and finger other combinations founded on the above example. The examples which have been given are confined to the white notes, but it is desirable to consider for a moment what modifications in the fingering are required when one or more black notes are introduced. It is, of course, possible to employ the fingering just given whether the thumb comes on a white or a black note, and this plan should be adopted for the purposes of technical study, even if it is not employed in actual performance. The more frequently employed plans are as follows—(a) with one black note the thumb avoids the black note altogether, (b) with two black notes the thumb takes one of these, but not the other.

(c) with three black notes the fingering is exactly as if there were no black notes. These plans are shown in the following examples.



All the above examples are derived from triads, and they are, to the fullest extent, exhaustive of the topic under consideration. The treatment of chords of the 7th, as well as of still more elaborate combinations, is analogous with that already shown, and hence does not demand any detailed illustration.

Many apparently difficult passages can be simplified by resolving them into their constituent elements, when one or more formulæ will be discovered which are well known to the student. For instance, the following passage from Raff's *La Fileuse* is a mere mass of confusion if the attempt is made to read the successive notes as they stand on the page.



If the student, instead of struggling in the manner which is far too frequent, will analyse the passage, he or she will very soon discover that it may readily be simplified. By taking the first, third, fifth, and successive alternate notes we obtain a chromatic scale, and the same result follows if we take the second, fourth, sixth, and successive alternate notes. The whole passage



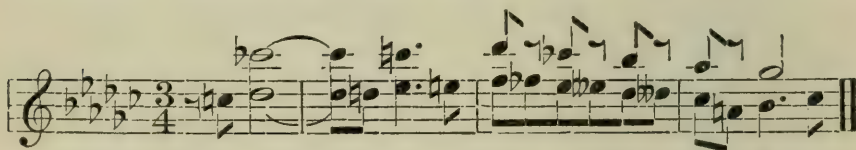
consists of two chromatic scales which are a tone apart. When this fact is discovered it is clear that the student need never look at the copy again, because of the discovery of a useful mnemonic. Also the passage may, for practising purposes, be extended to any length. The following *Cadenza* from Liszt's *Liebesträume*, No. 3, will repay careful examination.





Examples of the simplification of passages similar to the above can be found in almost any pianoforte piece which demands a large amount of executive power. The works of Liszt abound in such passages. Those that are quoted above are comparatively simple, and hence are of more general utility. The principles involved in their solution are equally available for more difficult passages.

Another phase in the simplification of passages is deserving of a little attention. It occurs when we translate examples of uncommon notation into a more familiar form.



The above passage, from Scharwenka's "Polish Dances," Op 3, No. 1, has a very forbidding appearance at a first glance, especially as regards the third bar. But if we observe that the lower notes of the passage, up to the beginning of the fourth bar, form part of a chromatic scale, the difficulty is solved. It will be found that the notes of this chromatic passage are most conveniently taken with the thumb and forefinger alternately. Also it should be noted that whenever the forefinger plays one of these notes the little finger is engaged a 6th or a 7th higher on the keyboard. On the contrary, the thumb always plays alone. Examples which illustrate the translation of notes in the manner just described could be multiplied to any extent, but we must content ourselves with one other illustration which has to do with the treatment of unfamiliar chords.



The above example is taken from Rheinberger's *Die Jagd*. In it every note is affected by either a flat or a double-flat, and the impression on the mind of the average pupil is, at a first glance, most confusing. Even after a considerable amount of practice this confusion is lessened very little if at all. The unfamiliar symbols pass into the mind, which in turn fails to realise that every combination of notes, if regarded in a rational manner, is an old friend. A slight examination shows that we have in the above example the major chords of E and A, the whole standing as follows.





The concepts which have been discussed in this chapter can, with suitable modifications, be adapted to all other musical instruments. The concept of grouping applies to those instruments to the fullest extent, but, in their case, there are only the symbols on one staff to be followed instead of those on two staves as on keyed instruments like the piano. The harp, which is in many respects analogous to the piano, also requires two staves, whilst the organ has frequently three. The concept which has been formulated under the name interval can be made very useful on all musical instruments. For instance, if, on the violin, two notes a 3rd apart are taken on the same string, that implies the use of fingers which are next but one to each other. This plan does not hold good if it is deemed necessary for the hand to take a new position when the second note is played. What has just been said appears very simple and obvious, but it is to be feared that the systematic study of intervals is not encouraged by a large majority of violin teachers. One great advantage of such study would be that the ears of listeners would not be tortured to the same extent as with the more frequent plans of tuition. Another device which will be found of great service in the case of young students is the ability to sing, mentally or audibly, to the Sol-fa syllables the notes which they are playing. The difficulties experienced in "double-stopping" can be lessened by a careful study of intervals. For instance, how many pupils are there who know the difference in position between the two fingers that take a minor 6th and those that take a major 6th on adjoining strings? If the difference in appearance between these two intervals was properly realised we should not have the ear-torturing combinations which too frequently are presented to the unfortunate listeners. It may be objected that a thorough knowledge of the positions of the notes which go to make up these intervals is amply sufficient for their correct performance. But that is by no means the case. If an interval is slightly out of tune the performer appears to be quite helpless, for no attempt is made, by a slight change in the position of a finger, to remedy the error. For instance, when playing an ascending diatonic

passage in 6ths, the distinction between major and minor 6ths is not maintained except in the case of very advanced performers. The major 6ths are generally too narrow, whilst the minor 6ths are too wide. This fault would be remedied if more attention were paid to the relative pitch of notes than to their letter-names. This slavery to the letter-names is one reason why elementary pupils are, for so long a period, confined to the first position on the violin. If proper attention is given to the study of intervals coupled with the employment of the Sol-fa scale-names, there is no reason why the third position should not be attempted very early in the student's career. Orthodox teachers will be shocked by the enunciation of such revolutionary ideas as the above, but they may rest assured that they are, at any rate, worth a trial. What has been said applies also to the 'cello, but it is necessary to observe that successive semitones on this instrument are frequently taken by adjoining fingers and, hence, that two notes a major 2nd apart on the same string in many cases require fingers which are next but one to each other. The distinction between major and minor 6ths in double-stopping can, because of this peculiarity, be made very clear on the 'cello.

In the early exercises on wind instruments, such as the flute and oboe, it is seen that the opening of successive holes in a certain order means an ascending scale, and from this the rational study of intervals and their appearance on the stave instantly tells how many fingers must be raised at the same time for any particular interval. As the music becomes more complicated other devices are required, but they are mastered with greater facility if a good foundation has been laid. The study of wind instruments of the class represented by the cornet leaves much to be desired. On this instrument there is a series of notes which are produced by the pressure of the lips, usually termed the *embouchure*. These notes are derived from what is known as the "harmonic series." By pressing the middle piston a slight addition is made to the length of the tube which forms the convolutions of the instrument, with the result that the pitch of any of the notes previously described is lowered a semitone. The first piston lengthens the tube a little more, and

so lowers the original note a tone. The first and second pistons, when pressed together, lower the original note a tone and a half, this result also being gained by the pressure of the third piston alone. One consequence of this similarity is that the average cornet player never uses his third piston unless he cannot produce his note in any other way. Even some who are regarded as really excellent performers fail to realise how much their resources are increased by a thorough study of the third piston. How very rarely do we hear any really fine "phrasing" in a performance on the cornet! It is very largely owing to this defect that musicians sometimes sneeringly distinguish between an artist and a cornet player. But the cornettist who has an ambition also to be an artist will not be satisfied until he has exhausted all the possibilities of the third piston, either when used alone or in combination with the first and second pistons. Through the employment of a little ingenuity in carefully selecting the most useful of the plans of fingering which are available under any given circumstances a great many progressions may be slurred instead of receiving that semi-staccato treatment which too frequently disfigures the average cornet solo.

In vocal music the natural grouping of the bar is not shown so clearly as in instrumental music. If two or more quavers are fastened together this signifies that they are to be sung to one syllable, but they convey no definite information as to their position in the bar. Hence the student has to rely upon a knowledge of rhythm and of the usual groupings of a bar. The manner in which skill may be gained in the correct division of a bar is shown on pp. 84-88. The student is also referred to pp. 268-345 of the "*Standard Course*" (Curwen, price 3s. 6d.) in which the manner of discovering the time divisions of a bar is amply discussed. The concept of "interval" may best be studied in vocal music by a preliminary grounding in the use of the Sol-fa names of the scale. No one who has not employed these names with the average singing pupil can realise their enormous mnemonic power. After a very little practice, if the name of the note can be found, its pitch will be given unerringly. The



acquisition of more skill enables the student to pitch the notes correctly whilst their names remain in the mind in a state of sub-consciousness. This condition is attained whenever the vocalist has thoroughly mastered the employment of the Sol-fa names, so that they spring into consciousness when required without the slightest apparent effort being made.

The appearance of accidentals adds very materially to the student's difficulties. In a great number, perhaps the majority, of cases these accidentals indicate a definite change of key. The collection of these accidentals so as to form the signature of a major key should not prove a matter of difficulty to a student who has worked a fair number of written exercises in elementary musical theory. Sometimes it will be found that the accidentals do not form a definite signature. In such a case it may be surmised that the music has modulated to a minor key. Any prolonged investigation of this kind is, of course, quite fatal to actual sight-reading, and the remedy in such cases is the acquisition of skill in the recognition of intervals. The laborious counting up of the number of semitones in such intervals is quite useless so far as sight-reading is concerned, but a very little thought should enable the student to recognise any interval at once. The most useful plan for this purpose is found in the recognition of what is known as the "sharpest note." If we write any series of notes of which each is a perfect 5th higher, or a perfect 4th lower, than the one which precedes it, we say that the former note is sharper than the latter. For example, in the series

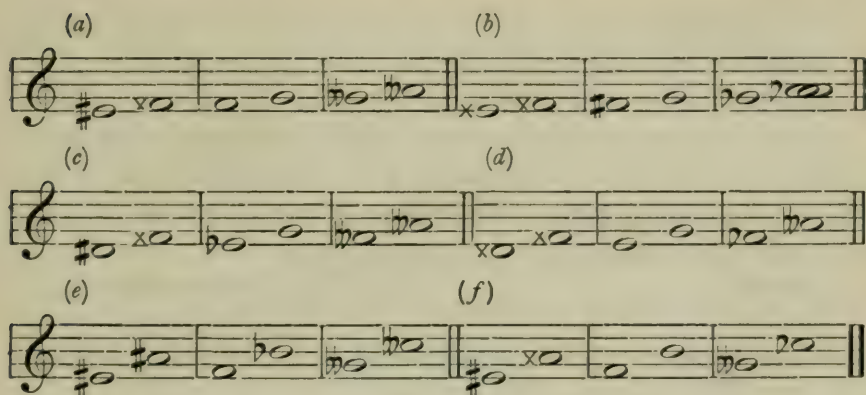
F C G D A E B

any note is sharper than all which precede it. We can extend this formula as follows

		E $\flat$				C $\sharp$		
		A $\flat$	B $\flat$			F $\sharp$	G $\sharp$	
	D $\flat$		F		B		D $\sharp$	
G $\flat$			C		E		A $\sharp$	
C $\flat$			G	A			E $\sharp$	
F $\flat$			D				B $\sharp$	

and thus obtain all the notes which are to be found in major

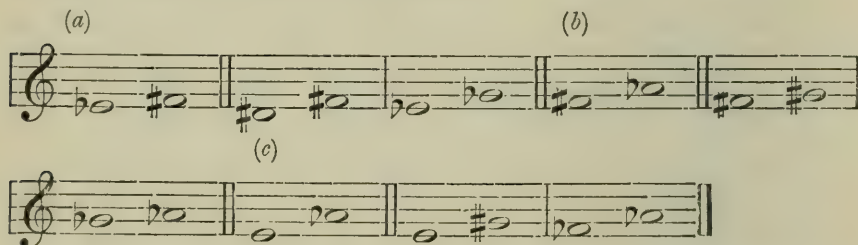




In (a) and (b) we have a series of 2nds, and we have to decide at a glance whether they are major or minor. We find that the upper note of the three intervals in (a) is the sharpest note, and hence we have major 2nds. By altering the lower notes of (a) we obtain (b) in which the lower note is the sharpest note, and we have minor 2nds. In the same way we discover that the 3rds in (c) are major, whilst those in (d) are minor, also that the 4ths in (e) are perfect, whilst those in (f) are augmented. The remaining diatonic intervals can be obtained by inverting those given above, and hence do not demand any detailed enumeration here. When intervals such as those given above are readily recognised they can be sung without the slightest difficulty if the mnemonic power which is latent in their Sol-fa names is evoked. Quite irrespective of the key in which the music occurs, any suitable pair of Sol-fa notes may be employed. For instance, a minor 2nd may be called **t, d** or **m, f**, whilst a major 2nd may be called **d, r**, **r, m**, **f, s**, **s, l**, or **l, t**. In each case the performer must decide which pair of notes is most convenient on any particular occasion. The most readily accessible Sol-fa names for the 3rds are, so far as their mnemonic power is concerned, **d, m** for a major 3rd and **m, s** for a minor 3rd, whilst a perfect 4th will be most frequently represented by **s, d** and an augmented 4th by **f, t**. Plans such as the above have been employed by the author in his own vocal practice for a great many years, and hence he is able to speak with confidence of their value. It is necessary, for the sake of completeness, to



notice briefly the more rarely used chromatic intervals. In all augmented intervals the higher note is the sharpest note, whilst this note is the lower note in diminished intervals. These intervals are never found within a range of seven notes in the diagram on p. 104. Sometimes a chromatic interval is very difficult to sing in tune. When this is the case it is generally advisable mentally to convert, by enharmonic change, the chromatic interval into a diatonic interval with the same number of semitones. It is obvious that such a change converts the sharpest note into the flattest note and *vice versa*. This is clearly shown in the following illustrations



In (a) we have an augmented 2nd which is converted into a minor 3rd by enharmonic change, in (b) a diminished 3rd which becomes a major 2nd, and in (c) a diminished 4th which becomes a major 3rd. The remaining chromatic intervals **can** be obtained from these by inversion. In all the above illustrations the higher of the two notes which form the interval comes last, but it is obvious that the contrary plan may also be employed.

The investigations which are found in this chapter are based on the two-fold power of every note. Hence whatever is contained in music must have regard to one or other aspect of these notes. A true appreciation of this fact will be found of immense assistance to the student. Instead of contemplating a vague and confused mass of details, a process of classification founded on the ideas which have been enunciated above will evolve order out of chaos. This is the true spirit in which all educational plans must be regarded.

## CHAPTER VII.

### ERRORS AND THEIR CORRECTION.

THERE are many ways of regarding errors. Some teachers appear to attribute them to an extra dose of original sin which has been absorbed by the pupil, and which must be exorcised at any cost. In some cases they will think it necessary to use violent means to counteract a tendency to err. Other teachers, again, regard an error as a personal insult directed against themselves. Or they may be so sensitive that a false note causes them positive mental pain and discomfort. As the result of any of the causes named above we have teachers of the piano who storm and rave, shouting at the top of their voice, or who moan and groan as if in actual physical pain. A false note will cause a sudden ejaculation most disconcerting to a girl, who, in cases known to the writer, has been made to weep by the inconsiderate conduct of her teacher. Other teachers, again, stamp their feet or thump the pupil, or, with violent gestures, use the classic phrase, "If you make that mistake again I will knock you off the music-stool." Whether any cases are on record of a pupil being actually "knocked off the stool" is unknown to the present writer, but such cases may be known to some of the readers of this book. It used to be said of the late Madame Rudersdorff, the eminent soprano, that she used to "slap" any of her young lady pupils who did not please her. She was a powerfully-built woman, and there is no doubt she could perform this operation effectively if she had any desires in this direction. Many other examples could be narrated of the brutal teacher, but those already given must suffice.

The first remark which must be made is that conduct such as has been described above is not teaching. Doubtless "attention"

is stimulated in some cases by a threat to "rap the knuckles" of a pupil, or to "knock her off the music-stool." In other cases the pupil is absolutely unable to do anything, being paralysed through sheer terror. How degrading a position for both teacher and pupil! Another remark is that when a teacher has had charge of the musical education of a pupil for a year or more, he must share the blame for any errors with his pupil. There is something wrong with the plans he adopts. Either the music is unattractive or it is too complicated; the symbols on the paper are not clearly apprehended, or they have not been accurately correlated with the requisite notes on the piano. In all such cases the teacher must be to blame. Invincible ignorance on the part of the pupil may be pleaded by the teacher, who is to be pitied rather than blamed if he has not realised that a true educationist will never despair even in the case of the dullest student. By the selection of suitable music even such a one may become interested. It may be, of course, that students such as have been described will never attain to any eminence as performers; that is very likely. But there is no reason why they should not perform simple but attractive music in a style which will give pleasure to themselves and their friends. The true mission of the average teacher is to make performers of this calibre, and he must be thankful if, once in a while, he gains a pupil or two who have exceptional talent. There are, of course, teachers who pose as superior beings, and who tell us that the average pupil should abandon the study of music, on the ground that any true artistic result will probably never be attained. If we dwelt in Utopia, where everybody always does the right thing, such a dictum would be of value, but not so in this work-a-day world. By making the best of indifferent material we are assisting musically in the pursuit of "the greatest happiness of the greatest number."

The true teacher, instead of regarding the errors of his pupils as a necessary evil, will treat them as an interesting and instructive psychological study. Because we are human beings we are all liable to error, even the most accomplished of us. If we were machines we should not be liable to casual error, but



only to functional derangement. The mechanical piano players so popular at present do not commit any errors, for the simple reason that they have no brains. The nearest approach to a mechanical performance amongst instrumentalists is the 2nd violin in a very ordinary dance orchestra. This is because he works within a very narrow area which he traverses with a dull unvarying monotony from year end to year end. In the waltz, the most frequent dance of the day, this is the kind of thing that he plays



Such music is called "vamping," and whoever first applied the word in this sense must have been inspired; it fits the music described so happily.\* The notes in each bar are played with a forward followed by a backward jerk of the bow arm, suggestive of the movements of a roughly constructed though efficient automaton. The present writer always gazes with a sort of fascination upon the 2nd violin player in an ordinary dance orchestra. Intent upon his copy, and with the monotonous movements of his bow arm, he appears like a personification of "fate," or of perpetual motion. When we come to a higher grade of musical performers we increase very materially the liability to error. Some of the very best soloists, vocal or instrumental, occasionally sound a wrong note or are not strictly in tune. In their case it cannot be supposed that there is any incompetence, but that the mental machine failed, momentarily, to do its best work.

What is the greatest error which a performer can commit? It is to come to a dead stop. No professional performer ever does this, and we should always train our pupils to keep progressing by hook or crook. A few years ago the present writer was listening to a performance of Liszt's "Spinnerlied" by one of the most eminent pianists of the day. By some

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\* Strictly speaking, "to vamp" is to extemporise an accompaniment, but the term is commonly applied, by orchestral players, to music such as that quoted above.

unlucky mischance the performer forgot what came next in the piece, but so deftly did he patch up the faulty passage that the substituted notes could not have been detected except by one who had studied the piece in question. The leader of a very small theatre orchestra had occasion to be annoyed with one of its members. The orchestra consisted of piano, violin, piccolo, and the inevitable cornet. The leader asked the pianist, who narrated the circumstance to the present writer, to be a witness to what he was about to say. Calling the piccolo player to him he said, "I give you a week's notice to leave the band." In great surprise at the unexpected notice to quit, the reply came, "What for?" "For making mistakes," said the leader. The piccolo player very indignantly said, "Do you never make mistakes?" This was intended to be a poser, but the conductor soothingly said, "Yes, my boy, but I know how to make a mistake. You don't." Here then is the philosophy of the treatment of errors. As we can't do without them we must conceal them in every way we can. The average pupil does not stop to correct an error because it has not been detected, but when the ear has been cultivated a little then this very objectionable plan is developed. With some the habit is gained of stopping for a moment, striking the correct note, and going on as if nothing had occurred. Such a plan is of not the slightest benefit. Every error is the result of some imperfection in the operations of the mind. Even if we assign the error to something which is wrong with the *technique* of the performer it arises primarily from something in the mind. Such being the case we should always ask ourselves if it is worth while to investigate thoroughly the cause of an error; if not it should be passed over. Regarded in this way, errors can be made most interesting to both pupil and teacher. The thoughtful teacher says to his new pupil, "Ethel, can you tell me why you played A instead of G." The dear little hypocrite, thinking to please her teacher, says, "Because I was careless." She does not really mean that, but thinks such an answer is conciliatory and therefore of service. He says, "I did not mean anything of that kind. In fact you were probably not careless in the sense in

which I understand the word, but there must be a reason for the error, and it is worth our while to find it out." How much better is a plan like this, when consistently followed out, than the drawing of a ring round the head of the note, a device much admired by some teachers. Drawing a ring round the head of the note is by no means an effective stimulus to the intellect. This is shown by the frequency with which the purpose of any particular ring is forgotten by the pupil. The remainder of this chapter will be devoted to a consideration of various classes of errors and their correction.

What is the commonest error on the piano? It is striking the left hand before the right hand in cases where the notes ought to be played simultaneously. This is a most insidious fault, for if once a performer becomes a victim to it there is the greatest difficulty in so training the mind that a right manner of performance can be acquired. Parenthetically it must be remarked that the reverse fault of striking the right hand before the left hand is probably non-existent, at any rate it is so rare that the present writer has never met with an example. This very striking discrepancy must have some connection with the mental operations which precede the actual striking of the notes. This sounds like a truism, but it is quite certain that such considerations do not receive the attention they deserve from the large army of teachers of the piano. The chief if not the sole reason why so many performers strike the left hand before the right is dependent on the manner in which we form a mental image of any particular combination of notes. From the very first moment that we are introduced to the stave the eye, and consequently the mind, ever travels upwards. The numbering of the lines and spaces of the stave is an evidence of this. We cannot think of the fifth line of the stave without the other four lines being present in the mind, perhaps in a state of sub-consciousness, but always ready to rise into consciousness should this be required. If we wish to find the notes of a chord we nearly always take them into the mind in ascending order. When we come to the formal study of harmony this habit is confirmed, for we always build up our chords from the lowest



note, whether this is the root of the chord or the bass of an inversion. The constant habit of taking in the symbols on the music paper in an ascending order must re-act on the efferent nerves, and hence upon the muscles by which the fingers are actuated. The fault under consideration soon becomes a confirmed habit unless there is untiring vigilance on the part of both teacher and pupil. One of the greatest obstacles to the remedying of this bad habit is found in the fact that the ear of the performer soon becomes so vitiated as not to be able to detect that the notes do not sound together. Not only so, if the teacher tries the experiment of striking notes in both hands in different ways, these present the same mental image to the mind of the pupil. For instance, strike the right hand immediately before the left, and ask the pupil which hand came first, when the answer will almost certainly be that both came together. Then ask the pupil to watch the hands of the performer whilst at the same time listening to the notes. After a few attempts the pupil will be able to recognise the real effect of the notes, when a fresh experiment must be made. The pupil must watch his hands whilst striking notes, so that the mental impressions of sight and sound may be accurately correlated. The simpler five-finger exercises may next be attempted, when it will be found that the fault in question is more liable to occur with certain fingers than with the others. When this is discovered exercises must be searched for, or if necessary devised, by which these errant fingers receive suitable discipline. This is done by selecting suitable notes to precede those taken by these faulty fingers, which should be approached in as many ways as possible. An illustration will show how this may be done. Let us suppose that the exercise (a) is played, and it is found that the note D is very imperfect, the exercises (b) to (d) may be employed, or some others which the teacher can devise for himself.



(c)

(d)



equal or superior. Success in the processes described above is not attained until a chord consists of perfectly even notes with whatever force it is struck. A very useful plan is to strike the chord several times successively, but so that each repetition is a little softer than the one which precedes. As a *pianissimo* is reached it will be found that one or other of the notes tends to disappear, when by a still more refined adjustment of the fingers, the fault is again remedied.

When the student has gained the power of striking the notes of chords with exactly equal force, it will be time so to train the fingers that any one of these notes may be made prominent at will. There are thousands of examples of a melody with a chordal accompaniment in the same hand in which this device is absolutely necessary if an artistic result is to be attained. This so-called *cantabile* playing must be ranked with the most difficult devices of the advanced performer. The first requisite is the recognition of the note amongst the mass of sounds, and the special direction of the mind to the particular finger concerned. At the same time the other fingers require equally careful and emphatic guidance, otherwise their notes will be too prominent. Pupils, when they first enter upon the study of the *cantabile* touch, have to contend with the difficulties to which allusion has just been made. When they make a special effort to "bring out" the melody, the fingers which play the accompanying notes also move vigorously. The consequence is that the melody is lost amid the mass of sounds. [The persistent practice of fugues is the best means for obtaining this independence of finger.] There are far too many students who play all notes with the same degree of force, quite regardless of any directions as to *f* or *p* which their music may contain. The term "music" is obviously a misnomer when applied to such dreary and monotonous performances.

Attention has, in the preceding paragraph, been directed to the faulty playing of chords when their notes have to be struck simultaneously. It will now be desirable to consider the faulty playing of chords which have to be performed



*arpeggiando*. The chief faults in this case are unevenness of force, or speed, or both. A well-played arpeggio forms one of the most artistic devices in a pianoforte performance. Its notes must follow each other with the most perfect evenness. This evenness is by no means always attained by pupils, especially in the case of very extended arpeggios in which the hands have to cross.



The above examples will illustrate what has just been said. In all the examples there would at first be a tendency to have a slight break in the sound before the thumb of the right hand took its note. This difficulty would be increased in (b) as compared with (a), because the performer's attention would be chiefly devoted to the note which is assigned to the thumb of the left hand. The dexterous turning of the left hand for the purpose of reaching this note at the right instant requires close attention until proficiency is attained. This difficulty does not exist to nearly the same extent in the case of those who are blessed with hands that have an abnormal span. The first eight notes in (c) would, after the previous chords have been mastered, present no difficulty to the student. But this is by no means the case with the highest note, which is played with the forefinger of the left hand. In the earliest efforts the pupil errs by attempting to play the arpeggio very rapidly, when the result is most grotesque. The left hand notes sound like an explosion, which, after a brief interval of time, is followed by a similar explosion of the right hand notes, and the highest note is delayed whilst the left hand is carefully passed over the right. To obtain an artistic performance of the arpeggio the notes must, at first, be taken very slowly, and the left hand must, at the earliest

possible moment, begin to move to the highest note. Delay in this respect is fatal to an even performance. When the mental ear is satisfied that the notes succeed each other at exactly equal distances, and not till then, the speed of the arpeggio may be increased until the requisite dexterity is attained.

In *cantabile* playing, where we have chords played simultaneously with the notes of the melody, and with the same hand, it is sometimes necessary to play them *arpeggiando* if the requisite distinction of force is to be maintained. In their anxiety to make the melody sufficiently clear some performers employ this device so persistently that at last it becomes an objectionable mannerism. That is a fault on the right side, for it is decidedly more satisfactory than a performance in which the melody is lost in a mass of notes. Anything is preferable to this dull uniformity, which is, alas, far too common even amongst performers who in other respects are of more than average ability. The writer has rarely met with a student who had persistently practised *cantabile* playing.

There is a peculiar form of stammering which is displayed by a considerable number of pupils. It consists in the striking of a note several times instead of only once. As a rule, pupils are quite unconscious of this fault. If the teacher asks the question, "Are you aware that you struck this note, or chord, twice?" the reply is generally, "I was not aware that I did." A fault which cannot be detected by the culprit requires very close attention. The reason for this peculiar fault is not far to seek, and it is quite analogous with the characteristics of the stammerer. There is a peculiar kind of unreadiness in the mental direction of the fingers which evokes what must be described as a halting and hesitating manner of performance. In precisely the same way, the organs of speech of the stammerer have not been adjusted so as to act simultaneously, and at a given instant. [The most efficient means for the eradication of stammering on the piano is the practice of concerted music, or the persistent use of the

metronome.] The mind is thus directed in a special manner to the instant when certain notes must be performed, with the result that an imperfect and loosely acquired concept of rhythm gains enormously in precision. This gain in precision is also of great value for the student's improvement in sight-reading.

Examples of imperfect time could be multiplied *ad infinitum*, but the principles involved in no way differ from those which must be assumed in the previous paragraph. There is, however, one peculiar class of error which must receive a little attention before leaving this branch of our subject. This kind of error is incident to the complications of what is known as "part-playing," in which notes of varying length are intermingled. The following extract from one of Cramer's Studies is a simple example of what is meant.

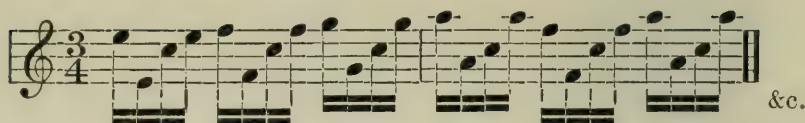


Almost invariably the right hand part of this extract is played as follows

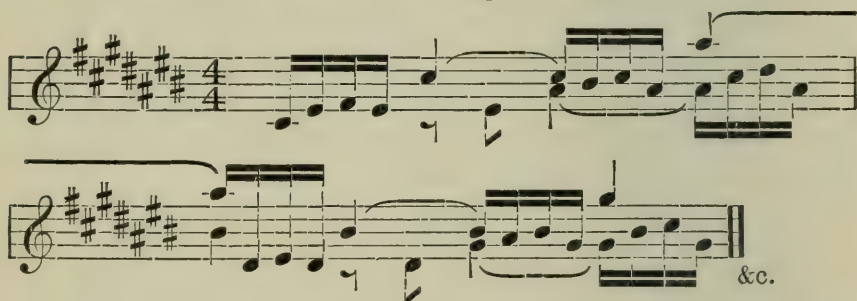


This result has evidently been caused by previous admonitions as to the manner in which the succession—dotted quaver followed by semiquaver—must be played. At a first glance it does appear that a group consists of this succession followed by its repetition. In many, perhaps a majority of cases, pupils find it difficult to realise that the four notes included in each group follow each other at equal distances of time, as shown in the following illustration.





In all cases where the time is complicated it is desirable, first of all, to find out the exact instant at which each note enters, and only when this is done may the actual length of time which each note occupies receive the attention of the student. This is shown in the following extract from Fugue No. 3, Book 1, of the "*Wohltemperirte Klavier*."



Only the treble stave is given, as this will save space, and there is no additional information to be gained from the notes in the bass stave. It will be observed that the extract abounds in tied notes, and this was one of the reasons why it was selected for the purposes of illustration. Many teachers would pass their pencil through every one of those tied notes which has not to be sounded. This is not a desirable plan, because it fails to excite the mental powers of the student. Although it takes a little more time, it is far better to cause the student mentally to note the positions of these tied notes, and to observe the peculiar effect which they produce in the mind. Such an investigation is materially helped if the student has a practical knowledge of harmony—that is to say, can hear the effect of harmonic combinations before they are sounded. In how few cases is this power possessed by the average student! After such an investigation as has been described the whole will stand in the pupil's mind as follows, and when this can be performed accurately the relative lengths of the notes will present comparatively little trouble.

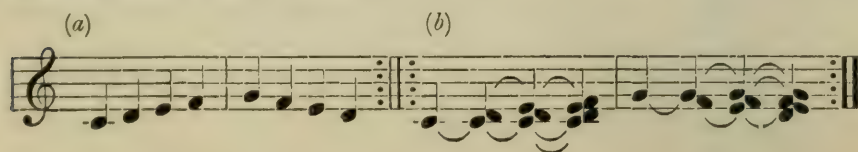


We have observed many varying circumstances under which notes may be struck, and must now carry our investigation a little farther. After striking a note what is the next active operation which is connected with that note? The practical common-sense answer is "Take it up." This reply will be accepted by a very large majority of performers, but there are some, even amongst our most eminent pianists, who find a great deal to do between the pressing and the releasing of a note. To give additional emotion to a particular note of the melody they continue to give an increased pressure to the key as if by this means they could squeeze a little more expression from it. That no such difference can occur under these circumstances is quite obvious to any one who has the slightest knowledge of the mechanism of the piano. If the action of the instrument has been regulated in a faulty manner it is quite possible that an increased pressure may cause the hammer slightly to touch the wire, when the sound will be checked or even blotted out. This peculiar effect, which is known as "blocking," is by no means what the pianist looked for or desired. There are other eminent pianists who appear as if they were trying to reproduce the "close shake" of the violinist by moving the finger backwards and forwards on a key whilst it is pressed. To anyone who is acquainted with the structure of the action of the piano this particular vagary appears most grotesque. It is, of course, possible that the anticipation of either of these curious plans may influence the manner in which the key is struck, but this is purely subjective, and has nothing to do with the mechanism of the instrument. In the same way those grotesque swayings of the body and noddings of the head

which are displayed by some excellent performers may be justified.

Another example of the hallucinations which the enthusiasm incident to an artistic temperament produces, deserves a little consideration. The "action" belonging to each note of a piano essentially consists of a series of ingeniously contrived levers by which the pressure of the finger on a key results in the pushing forward or upward of the hammer. If only so much pressure is exerted as to maintain the various parts of the action in a state of equilibrium no sound results. But if, on the contrary, a little more pressure is exerted so that this state of equilibrium is disturbed for an instant the hammer impinges on the string and a sound is emitted. The loudness of this sound depends absolutely on the amount of this extra pressure, and any student of Physics will agree that an equal amount of force will always produce the same volume and quality of tone whether the key is pressed by the finger, a block of wood, or any other agency. In fact the ear cannot distinguish any difference between the results obtained provided the force exerted is the same. Yet there are eminent teachers of the piano who seriously contend that a slight difference in the position of the hand or the curvature of the finger will influence the character of the tone quite apart from the actual force employed. Careful examination of the mechanism of the piano will show that such a contention is quite absurd, and that it can only arise from preconceived subjective hallucinations.

To release a note at the proper time is as important as to strike it correctly, but in far too many instances this operation does not receive the same amount of attention. How frequently do we hear the exercise (a) modified as at (b)! Instead of only one note being heard at a time we have two, three, or four. The exercise can be played with either right or left hand, or with both together.





What is said with respect to five-finger exercises also applies to scales, in which as many successive notes as possible are held down, and are taken up when the thumb has to pass under the fingers or *vice versa*. In the playing of studies and pieces this lingering of the fingers on the keys is very common. The peculiar mental training by which this fault may be eradicated demands that the muscles which actuate any finger are correlated with those of the other fingers. One of the best plans for this purpose is the persistent practice of the "slow shake," in which the will to employ the flexor muscles of one finger may be made to include the extensor muscles of the finger which was previously flexed. This plan should be continued until the mutual action of flexor and extensor muscles belonging to different fingers becomes secondarily automatic. When adjoining fingers have been practised in this way the exercise may be extended with beneficial effect by practising pairs of fingers a 3rd, a 4th, and at last a 5th apart. All these exercises should be taken with extreme slowness at first, and their speed must be increased only as the result of a large amount of practice. There is no part of the student's work to which the old adage, "The more haste, the less speed," applies more emphatically than that now under consideration. After a number of pairs of notes have been practised in the manner just described, successions of three notes in varied order may next engage the student's attention, and this should be followed by still more extensive series of notes. It cannot be too strongly impressed upon the pupil's mind that the will to raise one finger must also be the signal for the fall of the next finger.

Teachers, in many cases, reserve the most pronounced form of their anger for instances where one note is substituted for another. If they supposed that the wrong note was deliberately selected by the pupil there would be some slight excuse for their anger, but when there is no question of the *bona fides* of the pupil any such display of temper is very much out of place. How much better to try to find the reason for the

error, as this will probably prevent its repetition, and at the same time form a capital object lesson to the teacher in practical psychology. Let it never be forgotten that there is a rational cause for every error, and that it is the duty of the teacher to search for that cause. How much better to pursue a line of investigation such as this rather than to interject the words "wrong!" "wrong!!" in an angry manner. A few leading classes of errors must be briefly illustrated.

A wrong note is frequently played because a wrong finger is employed. It should never be forgotten that the easiest and most obvious finger is generally the most useful. To drag in a finger whose normal position is perhaps a 4th or 5th away from the note to be performed, whilst another finger is directly over it, is, as a rule, the height of folly, or, at any rate, a frequent source of error. Only when a contraction or an expansion of the hand seems desirable may the plan just described be disregarded. Another cause of error arises when a rapidly played passage suddenly alters its character. A frequent example of this is the sudden interpolation of a short chromatic passage in the middle of a long and rapid diatonic scale. Still more disconcerting is the contrary device, the introduction of a progression of a tone into the middle of a chromatic passage. Occasionally a thoughtful composer or editor will draw a line over the two notes by which the chromatic scale is interrupted. Another very frequent form of error occurs when a note is read in the bass clef instead of the treble clef, or *vice versâ*. This form of error is obviously caused by thinking more of the name of a note than of its position on the keyboard. Students should never forget that the bass clef means notes to the left on the keyboard, whilst the treble clef means notes to the right. Whichever clef is employed should suggest the correct movement of the hand. When once the hand has been trained in this manner the finding of the actual note presents little or no difficulty.

It would be possible to enlarge to any extent on the

striking of wrong notes, but one additional illustration must suffice. This occurs when an "accidental" near the beginning of a bar is disregarded before the conclusion of the bar.



The above illustration is, as a moment's investigation will show, in the key of E minor. Yet nine out of ten pupils would omit the D sharps where the asterisks are placed, whilst observing those which are actually found in the copy. Why should this be the case? The pupil knows the rule with respect to accidentals, but it is generally disregarded. The reason appears to be that the study of key relationship has been neglected. In the case of a properly trained pupil, such errors as have just been described would be instantly detected. With still higher training, to use a paradox, the error would be detected before it was made, for the finger would intuitively draw back from the wrong note. The remedy for the fault under consideration is therefore obvious. Where it is observed that there are many accidentals the pupil must carefully scan through the passage and determine the key or keys in which it is written. The implied accidentals will then be inserted in performance as the result of this investigation.

It will not be necessary or desirable to point out errors on orchestral instruments, but a short space must be devoted to the vagaries of the vocalist. Why should a presumably competent vocalist sing out of tune? Various solutions have been attempted, but they will not be reproduced here. Instead of that the writer prefers to describe some of the cases which he has observed, and to indicate what he regards as the most likely reasons for singing out of tune. A young man, tenor or baritone, sings in tune when he is having a



lesson in a moderately-sized room. When the scene is transferred to the platform of the concert room he is almost certain to sharpen, especially on his higher notes, even though he is accompanied by his teacher in whom he has every confidence. The reader may suggest that the nervousness due to an unaccustomed public appearance is probably the cause. There may be something in this, but extreme nervousness can only be a contributory cause, and the chief reason must be sought elsewhere. The sound of the singer's voice is louder to himself than to anybody else. Some vocalists will deny that their voice is abnormally loud to themselves, but that is only because they have become so accustomed to its tones that they cease to impress the mind so strongly as at an earlier stage of the singer's career. Any singer in the circumstances now under consideration is practically oblivious to every sound but that of his own voice. The cultivated singer unconsciously avails himself of every slight sound from the piano which he can catch, and employs these sounds to tune his voice. The half-taught amateur, on the contrary, does not realise the faint sounds of the piano even though they do actually enter his physical ear, and so his vocal performance is distressingly out of tune. Sometimes a sharp blow on one of the keys of the instrument will bring back the voice of the vocalist to the proper pitch, but that is usually only a temporary relief.

A soprano or contralto when singing a rapid ascending major scale frequently finishes out of tune, the final notes being usually sharp. There are two reasons for this peculiarity. After singing the tones which occur between the first and second, and second and third degrees of the scale quite correctly there is always a tendency to widen the semitone which follows, and this unconscious raising of the fourth note of the scale influences all those which follow. Another reason, which affects only scales of rather low pitch, is the influence of the "break" which is generally found about F sharp in the first space of the treble clef. Where great care has not been taken to bridge over this faulty place

there is always danger that the relative pitches of the notes in the different registers will not strictly correspond. The chief remedy in the cases just discussed is persevering cultivation of the ear. When this foundation has been laid the building up of a satisfactory superstructure should not prove unduly difficult.

With vocalists of all classes, from the highest soprano to the lowest bass, there is one favourite device which appears as if devised to promote singing out of tune. This is the employment of that kind of tremulous tone which is known as the *vibrato*. The *vibrato* appears to have a great fascination for vocalists, and some of them use it with charming effect. But in many cases the only result of a persistent *vibrato* is that the notes produced are quite out of tune. Vocalists who should happen to read this statement will deny it indignantly in their own case, however it may be with others. They may, of course, be right, but it is quite as likely that they are wrong. It is very difficult for a vocalist to judge of his or her own performances except by their effect upon an audience. Violinists when commenting on vocalists in conversation with the present writer frequently say, "Yes, he is an effective singer, but he generally sings out of tune." As there is no class of musicians who have a more finely cultivated ear than the thoroughly competent violinist, an opinion such as that contained in the last sentence deserves our close attention. This opinion has reference not only to second or third rate singers, but to some whose reputation stands very high indeed. Soloists on the violin or the violoncello nearly always use the *vibrato*. It was, in fact, the charm of this device which impelled vocalists to adopt the same plan. But the violin or 'cello solo does not sound out of tune. How is this? It is due to the fact that the tip of the finger is pressed firmly on the fingerboard. However much the pitch is varied by the oscillations of the hand there is always present, potentially, the actual note on which the undulations are founded. It must never be forgotten that these undulations are alternately of higher and lower

pitch than this note, and so long as it is firmly held under the finger an out-of-tune effect is impossible. In the case of the vocalist there is no mechanical means by which this central note can be retained, the consequence being that the original pitch is lost, and the remedy is obvious.

In strict analogy with what has just been stated is the performance of an ordinary shake. The violinist has one finger firmly pressed on the string, whilst the adjoining finger alternately presses the same string and leaves it. The rapid rise and fall of this finger goes to form the shake, the latter operation producing the auxiliary note, whilst the former operation gives the principal note. A shake under such circumstances can never be out of tune. There are very few vocalists who ever employ a shake, and when the attempt is made the result is generally lamentable. If the notes which form the shake should be a tone distant from each other, this distance frequently becomes narrowed to a semitone, and occasionally becomes widened until its notes are a 3rd apart. These aberrations are in part the result of lack of skill, but are also due to an imperfectly trained ear.

Turn we now, for a moment, to choral music in which there is frequently singing which is more or less out of tune. For this imperfection there may be one of several reasons. On a dismal Sunday morning the organist is often very thankful if the feelings of the choir are not unconsciously expressed by singing which is very flat. This out-of-tune performance will be intensified if there should happen to be a long psalm set to a chant in a minor key. What organists and precentors have suffered under such circumstances has not been revealed except in a very partial form. Another case may be cited. If one of the singers, with a voice not exceptionally strong, but with a tendency to flatten, attacks his notes promptly, he very frequently drags down the rest of the choir to his pitch. This process being continually repeated it is found that the glee or part-song which is being performed is possibly a major third lower at its conclusion than it was at the commencement. If to the vocal parts there is



added an instrumental accompaniment the pianist or organist has very little command over the pitch of the choir. He is generally obliged to abandon his part, or else to wait until the choir is a semitone flat, when he can resume his playing, but with the accompaniment suitably transposed, and this operation may be repeated as often as is required.

The subject of errors and their correction is practically inexhaustible. Every observant teacher could add innumerable illustrations from his own experience, which would be found of great interest by his colleagues. Varied as they might be in detail it would, however, be found that most if not all the examples adduced could be classified under one or other of the heads into which this chapter is divided. With respect to the correction of errors one final piece of advice may be given to teachers. In your dealings with your pupils be natural. If you are naturally of a serious disposition, beware of attempting to be facetious. The incongruous result would resemble the unwieldy gambols of a sprightly cow. If, on the contrary, you have an irresistible desire to make jokes, let these be subordinated to the main purpose of the lesson. An appropriate joke is frequently of great use for stimulating "attention." However humorous the remark made by the teacher he should, in his mind, always realise the ulterior motive which originated the joke.

## CHAPTER VIII.

## ART.

THE terms Art and Science are frequently very loosely employed, much confusion existing as to their mutual relationships with regard to any particular kind of work. Dr. Whewell, in his *Novum Organon Renovatum*, very happily distinguishes between the two terms. He says, "The object of Science is *Knowledge*; the objects of Art are *Works*. The latter is satisfied with producing its material results; to the former, the operations of matter, whether natural or artificial, are interesting only so far as they can be embraced by intelligible principles. The End of Art is the Beginning of Science; for when it is seen what is done, then comes the question why it is done." The facts relating to any Art which gradually accumulate are afterwards employed in formulating the laws of the Science with which this Art is connected. So the observations of a great many teachers were necessary before it was possible to discover the laws of the Science of Education.

It will be of interest to examine one or two examples of Art and Science which are more or less familiar to the teacher of music. The manufacture of the pianoforte is an Art which is, in some of its phases, connected with the Science of Acoustics. The methods of stringing the piano which are employed to-day represent the results of countless observations extending over a long series of years. The most suitable length, diameter, tension, and specific gravity of each wire have been determined empirically as the result of numerous experiments. Anyone who will compare an old square piano with a modern Grand will note a marked advance

as to quality of tone in the latter, and this is in part due to the careful selection of suitable wires. The thin brass wires of the ancient piano have been abandoned, and they are replaced by wires of the finest tempered steel of much greater diameter. Owing to the higher tension which the steel wires will bear, coupled with their greater thickness, the modern piano has a much fuller and rounder tone than its predecessor. Because of this increased tension the framework of the instrument has to be much stronger, whilst the sound-board is also strengthened, thereby giving us a larger volume of tone. The "tinny" tone of the old pianos has been materially modified by altering the point of the wire which the hammer is made to strike. All these things were determined empirically by the manufacturers long before the publication of Helmholtz's great work on Acoustics. Yet the laws formulated in that work account for and justify the plans which pure empiricism had dictated. The tuning of the piano by Equal Temperament has been very largely a matter of haphazard, and the required result is only attained by the most highly-trained tuners. The correct tuning of tempered intervals can be determined by listening to certain slow beats by which they are characterised. The rapidity of these beats is given in detail in "Construction, &c., of the Piano" (Curwen) in a tuning scheme which was formulated by the present writer. Long ago he used to listen to very good tuners, but was unable to account for the slow beats which he heard. The problem was solved when Helmholtz announced the compound nature of what had been regarded as simple tones. In tempered intervals an upper partial tone of one note is slightly out of tune with an upper partial tone of the other note, and this gives rise to beats whose number can be determined by an easy calculation.

There is an Art and a Science of Music. The playing of the piano is an Art, but the *technique* upon which it is founded is primarily derived from the Science of Physiology. Each muscle, each tendon, each joint has its proper use, and it must be of benefit to the teacher to supplement his empirical



conclusions with exact scientific knowledge. It is for this reason that a brief description of the different parts and uses of the human hand and arm is given in the Appendix. What has just been said applies also to vocal performances. We have on the one side the rules of the voice trainer, and these must apply to the manner in which the lungs are inflated, to the correct use of the larynx, and to those positions of the mouth which will give the best quality of tone. All these details have been determined empirically, and this forms the Art of Singing. But the Sciences of Physiology and of Acoustics should be examined if precision has to take the place of what is otherwise, in all probability, very vague and uncertain knowledge. If this precise knowledge were more widely distributed we should probably see more uniformity in the views of teachers of "voice production."

Psychologists have tried to discriminate between the Art of the Composer and the Science of Harmony upon which this Art is built. The analogy would be a very happy suggestion if there were such a set of Laws of Harmony worthy of the name, but in the majority of text-books there are only a series of empirical rules. These rules, being founded upon actual observations, are amply sufficient for the purposes of the student, who will find them indispensable in the earlier stages of his work, and so far useful. Writers who confine themselves to the mere enunciation of such rules are on perfectly safe ground, but this is by no means the case when they deem it their duty to account for them through the display of what they deem scientific erudition. One such display may be mentioned here, but others could be quoted which are equally infantile. Cherubini tells us that the reason why consecutive 5ths are objectionable is because a continued progression of such 5ths, when taken diatonically, would produce music which is in two keys. For instance, if the lower part formed the scale of C the upper part would form the scale of G. That is quite true, but it is inapplicable to any actual music for two reasons: (a) a succession of perfect 5ths is never carried so far as to suggest two keys; (b) the accompanying harmonies also preclude any

suggestion of the kind. Consecutive 5ths are objectionable when they have a harsh effect. Where this effect is not present they are freely allowed. The most elaborate attempt to formulate a Science of Harmony, the Day Theory, has no foundation in fact, and is, so far as scientific laws are concerned, a mere mass of unsupported assertions and absurd assumptions.

Besides the employment of the word Art with regard to music as described above there is also its classification as one of the Fine Arts. The Fine Arts are restricted to impressions received by the two higher senses—sight and hearing—and their primary purpose is to give pleasure. The pleasures of organised sights and sounds may range from the most simple to the most complex combinations of colours and forms in the first case, and of melody and harmony in the second. Some writers on musical subjects would regard this view as referring to very low types of music, and to very imperfectly trained listeners. They would contend that the higher walks of musical art should serve a more noble purpose than that of mere pleasure. In vague and grandiloquent terms they proclaim that music is the highest form of Art, and that it appeals to the highest mental faculties. Doubtless the performance of an elaborate fugue is an interesting mental exercise to the highly-trained listener, who will follow its complicated involutions with great pleasure. The same remark holds good with respect to a fully-scored orchestral work. But the result is in each case to give pleasure to the listener whose musical education is of such a nature as to enable him or her to understand the performance. The fallacy which underlies any contention that the Fine Arts are not chiefly concerned in giving pleasure is based on a false assumption. Any effective use of the mind gives pleasure to the thinker. To the mathematician there is beauty in a neat solution of a difficult problem, and there is, consequently, pleasure in its contemplation. Similar illustrations could be given from other departments of intellectual work.

Music as a Fine Art must by no means be restricted to what is approved by a certain school or clique. A certain amount of

catholicity of taste must be permitted—nay, welcomed. Yet we find many, especially amongst the less well informed, who restrict their attention to the musical works of a few favoured composers, whilst they regard all others as unworthy of notice. They express great contempt for those benighted beings whose tastes do not run in the same direction as their own. Their ignorance is only exceeded by their arrogance. If they are informed that they are listening to the performance of a work by one of their favourite composers they are enraptured. It is of no importance that the work is actually by one of their pet aversions. The name is sufficient for them, and they have not sufficient knowledge to discriminate between the styles which characterise the different composers. The Fine Art of Music is of interest to three classes of persons—the listener, the performer, and the composer. This classification is convenient, although faulty from a logical standpoint, because all those in the two latter classes are included with listeners. Also composers are generally performers, although not necessarily in the first rank.

The listener must have our first attention. The impression created in the mind of any listener must depend on the concepts which have been previously acquired. In other words the effect of a musical performance upon any particular listener depends very largely upon what he or she mentally puts into it, and no two persons can feel exactly alike in this respect. For instance, a young and enthusiastic musician who is not possessed of any advanced theoretical knowledge derives great pleasure from a musical performance. He is charmed with the melodies, and certain chordal progressions cause delicious cold shudders to travel down his spine. But let a few years pass over his head, whilst he is gradually acquiring useful musical knowledge. He hears the same piece of music, and with equal enjoyment as before. He is interested in the beautiful melodies, but now notes the connection of the phrases with their imitations, and the course of modulation. When those delicious chords are played he does not feel any cold shudders as he did before. Now he mentally notes that one chord is a first inversion of the dominant 7th, whilst the other is a chord of the augmented 6th,



German form. Not only so, but however much he may wish it he can never recover the peculiar kind of impressions which he felt at the former listening to the music. This pleasure is as great in the one case as in the other, but its character has changed. That is one of the penalties of knowledge.

The novelist has very rarely any effective knowledge of music. The only exception to this statement which is known to the present writer is Thackeray, who, in the few references to music which we find in his writings, is very careful not to rhapsodise or to go out of his depth. There are many other writers who show, in their descriptions, that they have no real acquaintance with practical music. In some cases they state things which are impossibilities. Making all allowance for these peculiarities, there remains a good deal that is very interesting if not actually informing in general literature. The practised writer can describe with fluency and ease the feelings which certain musical performances have evoked. We may marvel very much that a musical performance, however good, can have this effect, because the competent musician cannot experience any similar sensations. But we must not assume that there is anything ridiculous in feelings which for us are non-existent. Even the extracts from descriptions of concerts, written by enthusiastic but ignorant reporters, which are sometimes reproduced in the musical papers, and which seem so very ridiculous to us, must represent a definite impression on the mind of the writer. This is, of course, a very different thing from some of the displays of ignorance which occasionally appear in the papers. As, for instance, when the reporter turns "Awake, *Æolian Lyre*" into "Await the holy Elijah," or speaks of "*Acis and Galatea*" as "*Acts and Galatians*." Such results, which are by no means imaginary, show that the reporter lacks that instinct for accuracy which must form part of his equipment if he is to take a good position in his profession. A reporter who was gifted with a sufficient amount of common sense would instinctively feel that there was something wrong with the titles he had evolved from his inner consciousness, and if he could not gain

an opportunity of revising his knowledge he would simply omit those titles.

It is a curious feature in musical history to notice the way in which music which was, at one time, looked upon as being too abstruse to be acceptable by the average listener, has at last taken its place in the recognised *repertoire*. We can scarcely realise that Mozart's pianoforte music was placed in this category when first performed by the composer. The later works of Beethoven came in for similar treatment. They were regarded as being very learned and complicated, but as suggesting that he had gone mad, or nearly so. He was, in fact, known in Vienna as the mad musician. There are, no doubt, plenty of people who cannot even yet appreciate these elaborate productions. When they frankly say so we can pay them a kind of respect, but when they profess to adore anything so classical, at the same time feeling intensely bored, we can feel for them nothing but contempt. One of the latest composers to enlist enthusiastic partisans on the one side, and to provoke equally bitter opponents on the other, was Wagner. Any of our younger musicians who observe the manner in which Wagner is regarded nowadays will scarcely realise the strong opposition which his music excited less than a generation ago. One of the most amusing features of such contentions was the contempt with which an opponent was regarded. The young and enthusiastic musician looked upon his more experienced opponent as an old fogey whose mind was fossilised: the other, for his part, regarded an ardent admirer of Wagner as one whose acquaintance with the best music was very slight indeed. How can we account for the phenomenon just described, which, moreover, has appeared with the greatest regularity throughout the history of music? Even Claude de Monteverde, who wrote in the 16th and 17th centuries, was scolded by his contemporaries for introducing what they called his "new discords." The only explanation appears to be that the appreciation of new music, or rather of music which is founded on new lines, demands a distinct addition to previously

acquired concepts. As we grow older the capacity to acquire new concepts, or even to amplify those which we gained in the course of our earlier musical education, becomes very difficult, and with some temperaments impossible.

The performer must also be a listener if an artistic result is to be gained. In this respect the performer in a large room is distinctly at a disadvantage, because the effect on his ear is by no means the same as that received by his audience. Only by indirect means can the exact amount of force which is suitable to any particular concert-room be estimated. It is owing to neglect of this very obvious fact that both vocalists and instrumentalists are often quite ineffective in a concert-room who have been successful in the drawing-room. Injudicious friends, knowing of these drawing-room successes, have employed their influence to gain a hearing for the talented young soloist at an important concert, but with lamentable results. The notes on the piano which would have been quite clear and crisp in a small room are now blurred. Or the full round voice of the drawing-room has degenerated to a feeble bleat. The consequence is that the disappointed and discouraged young soloist has to say, mentally, "Save me from my friends," and what, with judicious management, might have been the commencement of a successful artistic career, is replaced with a feeling of indignation at the injudicious flattery which has caused the performer to occupy so unpleasant a position.

The selection of suitable music is, of course, of the greatest importance if an audience has to be gratified. To specify here what music is most useful would be of very little value, because what will be accepted by one audience would not be tolerated by another. One remark may, however, be made. Some people think that it is necessary to "play down" to the level of their audience. No greater mistake could be made. With an average audience a first-rate performance of an elaborate violin or pianoforte solo is accepted and enjoyed. A moderate or fairly good performance of such a solo would be received coldly, or not even tolerated. Assuming that a suitable vocal or instrumental selection has been made it must be performed in the most artistic possible manner.



Rules for the acquirement of expression have been formulated, and may be studied with profit. Still an artist will find plenty of occasions to modify such rules. For instance, we are told that an ascending passage suggests a *crescendo*. That is very true, but a *diminuendo* under such circumstances is sometimes very striking. A bold *crescendo* suggests a constant increase of speed in the passage in which it occurs, but how very imposing is the effect when there is a gradual slackening of the time under similar circumstances. The term *allargando*, a gradual enlarging of the outline of the passage, seems to describe this treatment of the *crescendo*. Only one piece of advice will be given here on this head. Always search for opportunities to give expression, and if you err at all let it be on the side of exaggeration. The elements of expression are very simple. We can go louder or softer, slower or quicker, and in a judicious mixture of these devices is included all that we mean by expression.

The composer learns his art in several ways. The *technique* of his art he acquires by the study of Harmony, Counterpoint, and other kindred subjects. Besides this he studies and listens to the music of other composers, whose style he unconsciously adopts. So we have the influence of Mozart in the early works of Beethoven. The advice given to young composers by the late Sir Sterndale Bennett was very sound. He said, "Write as much as ever you like, then put it away for six months. At the end of that time examine it and see what you think of it." Whilst any opportunity remains for revision before publication the young composer must never be satisfied. It appears as if composers were so much afraid of being accused of plagiarism that they refrain from writing naturally. No greater mistake could be made. Music must, at all hazards, be music, and not a series of difficult harmonic problems. If the young composer writes something which he regards as being exceptionally effective, and shows it to a musical friend, the suggestion will probably be made that it is very like something he has heard before. We have all candid friends who like to say such unpleasant things. If the composer

fails to detect the assumed plagiarism he should disregard the suggestion of his self-constituted critic.

Most composers are ambitious to write for the orchestra, and here a word of warning appears advisable. The mere reading of full scores is not of nearly so much value as the devices now to be described. The composer should write or arrange some music for any small band whose services he can enlist, and should not fail to listen to the effect of his work. If there are any portions which do not appear to produce the effect which he desires, the passage must be re-arranged, and this revision must not be regarded as complete until the composer is quite satisfied. With so many orchestras at the places of amusement in the various watering places during the summer, a young composer can generally, by means of a little tact, have his music tried over if he has a legible set of band parts written out. The trying over of something new is very acceptable to such a band, because it relieves the monotony of their daily grind. Another plan for gaining an intimate knowledge of the art of orchestration is to take a set of band parts, and from them to make a full score. The gradual growth of the score is most interesting to the earnest student. Instead of this plan another may be suggested. Take the pianoforte arrangement of some orchestral work and make a full score without the assistance of the original. A comparison of the two scores is most interesting and instructive. Conversations with orchestral players as to the *technique* of their instruments can be made of the greatest use by the student, who should offer to take the pianoforte part in any duet which they may possess. For instance, a really competent horn player is almost certain to have a copy of Beethoven's Sonata for piano and horn. If he is possessed of the work he will be delighted to take part in it, so as to have a little relief from the long dreary parts, largely consisting of holding notes, which he usually plays. If he will consent to perform his part as intended by Beethoven, that is without the use of valves, the student will realise the effect of the hand-horn, whose snuffing closed notes he will by no means admire. If such

notes were ever beautiful, then the proper manner of using the hand-horn is a lost art. Other examples of concerted music will come before the notice of the earnest student, but sufficient has been said on this subject.



## CHAPTER IX.

## ON EXAMINATIONS.

THIS chapter has nothing to do with what is known as the "examination craze." The subject has been discussed at sufficient length by partisans on both sides, who would not be convinced by any considerations which might be adduced in this chapter. We are all being examined and acting as examiners at all times, both with regard to music and to many other things. The fashionable Sunday parade at a popular watering place is only a transformed examination centre where the promenaders scan each others' costumes, and in which all are examiners and all are candidates. Some of the candidates dress with such taste that they "pass with honours," whilst others fail ignominiously. The preacher in the pulpit and the orator on the platform have before them a company of examiners, many of whom are very incompetent for the work, but they have to be reckoned with if success is to be assured. Further illustrations of this point could be supplied to any extent, but enough has been said. Turn we now to observe the many different kinds of examinations which the study of music will present.

Perhaps the most important examination of all is the daily self-examination of the pupil. Yet it is to be feared that in only a very small minority of cases is the advisability of this form of examination recognised. The pupil seats herself at the piano and plays over the study which she is learning two or three times, and makes the same mistakes that were pointed out to her at her last lesson. She closes the book and opens her piece, which she also plays through as far as the last pencil-mark of her teacher, returning to the beginning again and repeating the previously-described process two or three times. By the time this is finished she is tired of the work and omits to play any

scales. "What a waste of time!" the reader will exclaim. True, yet it represents at least three-fourths of the "practising" which takes place on every working day throughout the country. There is no self-examination in such plans of study as have been described, and the result at the end of the week is a very small amount of improvement, which is, in fact, out of all proportion to the time involved in the operations which have just been described. When the next lesson is taken and the teacher complains that there is little or no improvement since the previous lesson, he is met by the remark, "But I can assure you that I have practised an hour every day." The teacher says, "You mean that you have sat at the piano for that length of time every day. I do not dispute that, but you did not put a sufficient amount of thought into your work." In other words, there was no self-examination.

The teacher would then point out a particular place on the page and ask if the pupil remembered what error was present there at the previous lesson. The answer would be almost certainly, "I don't remember," or else, "Oh, I remember now, but I had quite forgotten until you mentioned it again to-day." The teacher goes on, "Then you did not play over and over again the bars which include this error?" and the answer would be, "No, I went straight through the piece." The teacher would then go on to show that each error should be localised in the pupil's mind, and that the passage in which it occurs should be played over until the wrong note is made quite safe. To make quite sure, the first operation should be confined to the bar in which the error occurs, or even to a portion of the bar. When the difficulty is apparently overcome go back a bar or two and see if there is any danger of a renewed error from the difference in the manner of approach. A very excellent pianist once told the present writer that he was never satisfied that he had conquered an error until he had played through the passage in which it occurred twelve successive times perfectly. If he broke down at the last repetition he re-commenced the work, and persevered until he attained the standard at which he had aimed.

To resume the imaginary lesson, the teacher will impress upon his pupil the necessity for localising the place of every error, and of practising each one separately. Until this is done the piece must never be played through, but only in small sections. The pupil may say, "But I can never remember all those places; may I mark them, or will you put a ring round the notes?" To which the teacher should reply, "You may have any aids to your memory that you like; my one object is to gain a good performance of your piece. But you must not be satisfied until you have rubbed out all those pencil-marks." Aids to memory are very good things if the attempt is not made to allow them to occupy the place of brains. The gradual erasure of one pencil-mark after another can be made a very interesting piece of work by the student, and when intelligently employed it promotes accuracy of thought and reliability of memory.

The work of the teacher, as described above, forms the second kind of examination which the pupil has to undergo. Every lesson should include an examination as one of its constituents. Even in the case of a new pupil who has had previous lessons the first process should always be a little examination in sight-reading and in knowledge of elementary theory. If the pupil fails in this it is, of course, a reflection upon the previous teacher. There are some teachers who are so unwise as to disparage the work of their predecessors. Whatever their opinion may be it is most unwise to express it if it is of an unfavourable character. Even if the pupil disparages her previous teacher, the lead so given must not be followed up. In future lessons the teacher is examining his own work, and must take his share of whatever praise or blame is attached to it. One piece of advice is offered to the young teacher—always give praise where it is fairly earned, and in fact search for opportunities for commendation. Such praise is frequently an incentive to the pupil to do better work. It is to be regretted that many teachers never dream of praising their pupils, although they are very ready to find fault. Quite recently a teacher is reported to have said, "I never praise my pupils." Any one who could make such a remark must be a pompous noodle. The object of



every true teacher is the improvement of his pupils, and any means which he can devise for this purpose should be searched for and employed. There are two such devices which are far too much neglected. These are the encouragement of pupils by kind words, and the selection of attractive music for them.

We have seen the manner in which the pupil can examine herself, and also how she can be examined by her teacher. It will now be desirable to observe one or two ways which involve the examination of both the teacher and his pupil. The scene is the back-parlour or the drawing-room of a private house, and the usual weekly lesson is just over. Just as the teacher is leaving, the mother makes her appearance and says, "How do you think our Sophy Agnes is getting on?" The teacher replies, "Oh, very nicely." This is a non-committal remark which the teacher will often find very convenient. The lady goes on, "My husband's aunt Sophy was over the other day and she did not seem very well satisfied. She was a good player in her younger days." The girl has been named after Aunt Sophy, who is possessed of a private income, and hence must be treated with great deference. It is quite as likely as not that Aunt Sophy never attained to anything higher than the "Maiden's Prayer" or the "King Pippin Polka;" many a reputation has been built on as meagre a foundation, but we see that she poses as the examiner of the teacher. Owing to her pecuniary circumstances she may so influence the parents that they may look out for a new teacher for their daughter, who will in turn be at the mercy of Aunt Sophy and her informal examination.

Take another scene of a similar character, but the pupil this time is a boy. The mother says to the teacher, "Do you think our Robert Joshua cares for his music? We can't drive him to the piano." The reply of the teacher is, as before, "He is getting on very nicely." The fact is that the boy takes a great deal more interest in football and the League table than in playing the piano. The mother says, "He tells me that he does not like his pieces, there is no tune in them." What can the teacher say? It is of no use to contradict the good lady, that will only make matters worse. The teacher has given the poor

unfortunate boy one of those uninteresting lucubrations which is termed a sonatina. Now there are sonatinas and sonatinas. The large majority of them are written in what must be regarded as an obsolete fashion, and we should no more expect the average boy to enjoy the performance of an old-fashioned sonatina, such as those of Clementi, Dussek, and other composers of about the same period, than he would the reading of the novels of Miss Edgeworth or of Miss Austen. Both in his reading and in his music a boy should be provided with material which is suited to his intellectual powers. If he proves to have real musical talent he may eventually like to practise high-class music such as sonatas, just as in his reading he may take up the novels of Fielding and Smollett, or Addison's "Spectator." The average boy wants a lively march which "has some tune in it." Anything slow and sentimental he will pass over with contempt, and he will call it "rot," his favourite expression for whatever he dislikes. Let us hope that the teacher who has this boy in hand will emerge successfully from his temporary embarrassment, and that his pupil will try to do some better work.

Passing on from the informal examinations of which examples have been given, we now come to the public examinations which are so numerous at the present day. Whatever we may think of these examinations their rapid multiplication shows that they have been devised to meet an undoubted public want. That these examinations can be used in such a way as to be very detrimental to the pupil cannot be denied. Whether such detriment is the logical result of examinations, or whether it is owing to their abuse, must be left for the decision of each individual teacher. Sometimes a fond parent desires an examination which is far too difficult for her daughter. The pupil, who is as ambitious as her mother, does not spare herself, but works very hard so as to ensure a pass. She is successful at the examination, but the reaction from the tremendous strain of the previous few months now makes itself felt. The pupil is found to be highly neurotic, and she has to go away for a few weeks or months so as to regain her normal state of health. In many cases an entire recovery is never gained, but the poor unfortunate

pupil has to feel lifelong regret that she "went in" for a musical examination. It is not necessary to say that a case like the above displays the objectionable side of examinations. Whoever is responsible for this result, whether parent or teacher, must be severely blamed. Examples such as that which has just been described are not really frequent, but they are by no means unknown. If a difficult examination is in contemplation the teacher is very unwise if he does not suggest that his pupil's health is a first consideration, and that the duty of seeing to that department must belong to the mother or to the family doctor. The teacher should most impressively warn all who are concerned of the danger of too great and long continued a mental strain. There are plenty of parents to whom this part of the subject is not known. When, as the result of their ambition for their child, the strain of a series of examinations brings on some form of brain-trouble, they must regret that they were so eager. If the examinations had been spread over a longer period the unfortunate result would not have occurred, and the pupil would not have acquired a great repugnance to her music.

We have seen the way in which examinations can be misused, and it is now desirable that we should for a short time contemplate a rational use of examinations. A pupil of fair ability, but who is not very thorough in his or her work may derive much benefit from a carefully chosen examination. One of the chief conditions of such an examination is that it shall be of only moderate difficulty. Any examination which demands a very hard grind on the part of the pupil is of very doubtful value in a great many cases. At any rate, such an examination is not advisable in cases where the pupil is young enough to expect to have lessons for a long period. Yet we find children of twelve years of age sent in for examinations which are primarily devised for their seniors. It may be objected that some children of twelve can do better work than others who are three or four years older. That is quite true, but both physically and mentally such forcing of the very young is most unwise. The teacher should be quietly preparing his pupil for the intended examination by the selection of suitable music, and by letting scale and arpeggio



practice conform to a certain syllabus. All this time the pupil is quite oblivious that the teacher has an examination in contemplation. At last, but allowing ample time for the work, the teacher brings the music for the examination. With such care in the preparation of the ground success in the examination is almost certain, and this without any undue mental strain on the part of the pupil. After the lapse of a considerable period another examination may be taken up as before. The result of work of this type must be to make thoroughly efficient performers. There is plenty of work, but it has been pleasant. How different is the plan which is adopted by some teachers! The moment that one examination is over the work for another must commence, and a bare pass is deemed satisfactory by everyone concerned. Really good work is quite impossible under such circumstances.

What do we mean by an examination, and what purpose does it serve? Two distinct and separate processes are implied in any of the forms of examination which have occupied our attention in this chapter. If both these processes have been thoroughly attended to we have success in the examination, but if either of them is left in an imperfect condition then we must have failure. The first process is that which has occupied our attention throughout this book. This is the accumulation of an appropriate series of concepts, and the acquirement of facility in their employment. The selection of these concepts is the duty of the teacher who should see, by means of informal examinations such as are described in this chapter, that they are clearly apprehended by the pupil. The proof that these concepts have been thoroughly assimilated is displayed in the dexterity shown by the pupil, either in grasping points of theory or in vocal and instrumental performances. The second process is, of course, the ordeal of the actual examination when, in a few minutes, the laborious accumulations of several months must be displayed. That candidates, especially in practical examinations, in many cases fail to do themselves justice is a notorious fact. They suffer from what in the case of public performers is known as "stage fright." It seems a curious thing that work which is well within the

powers of a performer under ordinary circumstances should be found so difficult when the examination occurs. Why should the introduction of a new concept prove so disturbing to the rest of the mental machinery? No rational explanation can be given, and only custom can eradicate, or at least modify "stage fright." It is hence very desirable that the teacher should let each lesson include an examination as nearly as possible like the forthcoming ordeal. For instance, scales must be asked for in anything but regular order. If this plan is neglected the candidate will feel very much disconcerted at the actual examination. It may be objected that all this has no necessary connection with real music, and that it is more like a game of skill in which the opponents are the examiner on the one side and the candidate on the other. There is something to be said for this view, but it will be more appropriate to describe it as the devising of "means to an end." This end is, primarily, success in an examination, but it must necessarily also imply increased skill as a performer. The readiness which has been gained by plans such as have just been described must tend to effectiveness both in reading music and in its skilful performance.

What has been said with respect to public examinations has had reference to our pupils. Before leaving this part of our subject it will be desirable to say a word or two as to the examinations by means of which the teacher qualifies himself for his daily work. There are some persons, perhaps a great many, who would contend that no examination can ensure the effective equipment of the teacher. If to this objection there is added the proviso that only the effect of the examination itself must be considered, we should all agree with this opinion. It is conceivable that a young professional man will confine himself exclusively to the studies required for the Degree or Diploma which he desires to gain, and that he will rely absolutely upon the possession of this distinction to give him an assured position in the eyes of his present and prospective pupils. In such a case, which is by no means hypothetical, it is more than likely that the ambitious young man will have a rude awakening. If, on the contrary, he pays a good deal of attention to those topics

which are not required for his examination, and especially if he does not neglect the requirements of a good general education, then his Degree or Diploma will prove to be a valuable adjunct. What has been said in the earlier part of this Chapter as to plans of study applies equally to teachers and their pupils.

In the examinations which have so far claimed our attention every candidate who can display a certain standard of proficiency is successful. It will now be desirable to consider the competitive examinations of which there is so great a variety at the present day. In the competitive examination there may be an indefinite number of thoroughly efficient candidates, but the large majority must fail because of the circumstances under which the examination is held. Hence it is no exaggeration to say that any definite standard of proficiency cannot be specified in such cases. The candidate who might have gained a particular scholarship on one occasion may be far below the winner on the next occasion. This varying standard must be reckoned with by all those who are ambitious to win an important scholarship. It is, of course, conceivable that an occasion may arise when no candidate displays the requisite proficiency, and the scholarship is withheld. The difficulty which is inevitably attached to the winning of an important scholarship is also a measure of its desirability. The scholar who becomes a student at one of our foremost musical institutions is of necessity a marked man who is expected to do the very best kind of work. If he realises his responsibility in this way, regarding the scholarship which he has won as merely a stepping-stone to something higher, he is bound to take a really distinguished position in the musical profession. If, on the contrary, he thinks that he has earned the right to "take it easy," his scholarship will prove to be of little or no value to him.

The competitions which are offered by some of the musical papers are, of course, a form of examination. In this case there may be hundreds of worked papers sent in for adjudication, and of these a large proportion are above the average, whilst a few will show great proficiency. Yet only one of these last can gain the prize which has been offered. The present writer has been



much struck with this fact when engaged in marking the papers sent in for an apparently easy subject like the Rudiments of Music. A thoroughly equipped musician must know everything appertaining to such things as intervals, scales, and time-signatures, and if there is anything of which he is not quite certain he has books of reference to which he can turn. Yet it is a fact that in only one case, out of a good many competitions, did the prize-winner obtain full marks. In all the other competitions some minute thing had been overlooked. Even such a result as this displays mental discipline of a very high order, which will be found of immense service when attempting something of much greater importance than a competition such as those under notice. For this reason ambitious young musicians are strongly advised to enter for such competitions. Even if they do not gain a prize, the mental discipline which they will have undergone to obtain a good position in the competition will prove to be of very great service to them.

The competitions which have received our attention are held in private, but we must now consider those public competitions which are so much the rage at the present day. The multiplication of these competitions, added to the lavishness of their promoters in the matter of prizes, must make it a very difficult matter for competitors to avoid being in a position to claim the title "Prize Band" or "Prize Choir." If a choir cannot win a prize at an important competition they must go to another of a lower grade, when they will be able to gain the coveted title. This is analogous with the desire of some professional men to gain a diploma which demands a very small amount of study on their part. If any such happen to read these sentences they are earnestly warned against pursuing so suicidal a policy. The relative values of certain diplomas may be obscured for a time, but this cannot be the case permanently. In the same way the prize choir or prize band of some obscure competition only provokes ridicule. This result also follows if a once famous musical combination gradually deteriorates, whilst still holding up to the admiring gaze of the world the proud distinction which was won a few years before. The lady who was once renowned

for her beauty, in a few years becomes conscious that the fingers of time have very seriously reduced her charms. This depreciation she endeavours to remedy by the use of certain artificial aids which it is unnecessary to specify here, and which are analogous to the continued use of the title Prize Choir, by which it is hoped that the deterioration of the performers will be concealed.

The large majority of the competitions now under consideration require the performance of one vocal or instrumental piece. The name of this piece is announced some time before the date on which the competition is to be held. Immediately those who are ambitious to gain the prize commence the interminable grind which is necessary if they are to outstrip their rivals. It will not be denied that some benefit may be derived from persistent practice such as has been specified, but it may be questioned if there is any reasonable proportion between the labour expended and the consequent result. What has been stated on page 67 with respect to examinations applies to the fullest extent to competitions such as those now under consideration. Within the last few years this view has evidently gained ground with many of those who promote contests for vocalists. The brass band contests still follow the good old lines. In some of the vocal contests a number of pieces are specified for any particular competition, and there is the further gratifying fact that choirs are invited to attempt a sight-test. If the "powers that be" would make the sight-test the chief feature of any particular competition, whilst giving a small number of marks for a prepared piece, chorus, part-song, or glee, the progress of vocal music would be immensely accelerated. The benefits derived by the performers would be infinitely greater than what can be gained from the minute attention to pettifogging details, which appears to be a necessity when training choirs under present conditions. Anyone who has scrutinised the elaborately marked copies which the conductors of some successful choirs deem necessary will not think that the opinion expressed in the previous sentence is any too strong.

A few years ago it was customary, in the case of soloists who sang at a public competition, for all the audience to be the judges.

The relative positions of the competitors were decided by their votes. Such a plan is beneath contempt for several reasons. The majority of the audience are not competent to express an opinion on the relative merits of the competitors. That competitor is almost sure to win who has the largest number of partisans who are prepared to pay for admission to the concert at which the contests are held. The self-constituted judges are quite conscientious of course, but they are unconsciously biassed in favour of their friend. The kind of competition just described is practically obsolete, or is largely confined to the performances of comic singers.

Competent musicians are now engaged to act as judges of competitions. But the large mass of the audience also forms a body of unofficial judges who, being partisans of one or other body of contestants, express opinions which are by no means complimentary to the justice of the decisions which have been given. Such self-constituted judges are anything but "sportsmanlike" in cases where a choir in which they are interested is defeated. This is frequently seen in the letters which appear in the local papers, and which are full of "envy, hatred, malice, and all uncharitableness." To the writers of these letters the musical contest which has excited their ire appears to be on a level with a football match in which the local team has been defeated. In the case of brass-band contests the feelings of disappointed competitors have been shown in a still more pronounced manner, for judges have had to run the risk of receiving serious personal injury. This is analogous with the process known as "mobbing the referee," which is not unknown in connection with football matches. In all such cases it is quite obvious that music has the least share in the minds of both contestants and their friends. Their motto appears to be "get a prize, honestly if you can, but get it!"

The last kind of musical examination which calls for discussion here is that which is undergone by the professional vocalist or instrumentalist. In view of the large number of aspiring young vocalists who are ever bidding for the favour of the public, this form of examination is a competition which is analogous with



some of those which have just been described. The audience at the concert where this performer appears are the examiners, and he or she is the candidate. To pass an examination under these circumstances is a matter of life and death to the public performer. It is to be feared that far too many vocalists fail to observe this very serious side of their work. If a singer can make a great impression upon an audience engagements from concert givers will multiply, but if that singer is only indifferently received he or she is not wanted again. The sole criterion which is recognised by concert givers and concert agents is success. Perhaps the unsuccessful singer may comfort himself with the contention that his performances are of too high a class to please a popular audience. Even if this were the case how foolish he has been not to adapt his selection of songs to what he supposes to be the standard of his audience. But he is quite wrong in his contention. From the observation of a great many concerts the present writer can affirm, with the greatest confidence, that an average audience will always accept and applaud a really first-rate vocal or instrumental performance. Mediocrity is of not the slightest use. Public performers should never forget that there is one moment when they can be quite sure that they have the entire attention of their audience. That is at the instant when they appear on the platform. In the jargon of the present day, that is, for them, the "Psychological moment." If they can produce something striking or interesting the attention of the audience is retained, and they may be said to have "passed their examination with honours." How important then is the selection of suitable music and the manner in which it is performed under such circumstances. A well-known favourite can afford to sing badly sometimes, and also to choose uninteresting and unsuitable songs; not so an unknown vocalist.

We have now finished our investigation of the mental processes involved in any educational course. The first part of this investigation included the various plans by which knowledge is communicated to the mind, and this was followed by our observation of the results of these plans in the case of our pupils.

To get the greatest possible good from books of this class students should try to find illustrations of every point which they must derive from their own observation and experience. Every teacher, however young, can find illustrations which will be quite new to his colleagues. Although it is quite true that pupils do very much the same things under the same circumstances, yet there are slight differences which the thoughtful teacher will observe. By this means the pleasures of the teacher will be materially increased, and his mental outlook will be enlarged.

## APPENDIX A.

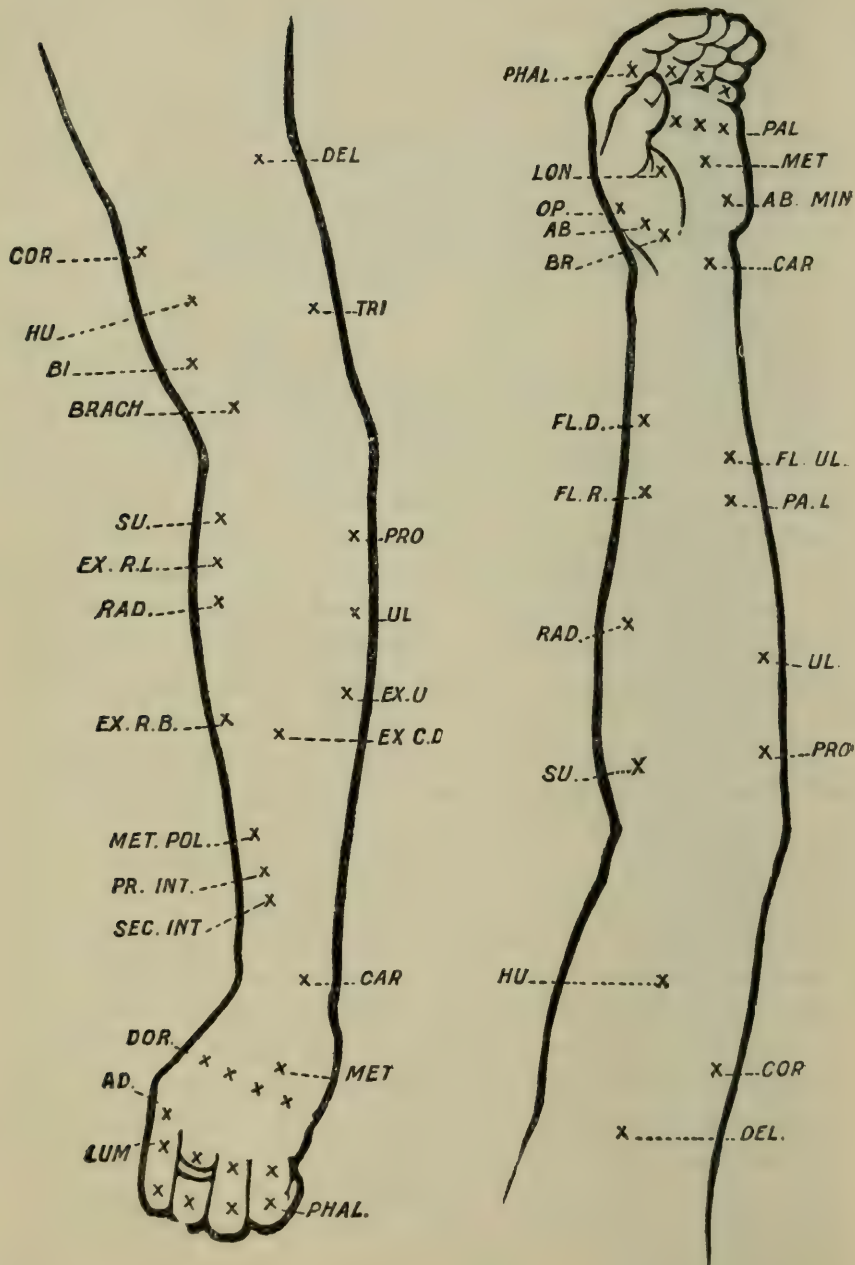
THE HUMAN HAND AND ARM, THEIR  
CONSTRUCTION AND ACTION.

THE descriptions which follow will be found to be quite clear and reliable. They do not, of course, enter into all those minute details which are absolutely necessary for the medical student when preparing himself for his examinations, but are confined to those broad outlines which the teacher of the pianoforte ought to know if he wishes to be regarded as thoroughly equipped for his work.

In the following diagrams the initial letter and one or more of those which immediately follow are employed to indicate the name of the bone or muscle to which they belong. This plan is more helpful than the employment of letters in alphabetical order, or of figures in numerical order for this purpose.

The bones of the arm, commencing from the shoulder, are as follows. The upper arm has one bone, the humerus (HU.), which forms part of the shoulder joint at one end and of the elbow at the other. The forearm consists of two bones which lie parallel to each other and are called the ulna (UL.) and the radius (RAD.). Their upper extremities form, with the humerus, the elbow joint, whilst their lower extremities form part of the wrist joint. Students should bear in mind that the radius is that bone which appears to be, practically, a continuation of the thumb, whilst the ulna can be found by passing the hand along the outside of the little finger until the wrist is passed. The carpus (CAR.) or wrist consists of eight bones placed in two rows, those in the upper row, counting from the thumb are the scaphoid, the semilunar, the cuneiform, and the pisiform. Of these, the first two form a joint with the radius and the third with the ulna. The lower





row of carpal bones, counting from the thumb, are the trapezium, the trapezoid, the os magnum, and the unciform. The trapezium and trapezoid are jointed with the scaphoid, whilst the os magnum is jointed to both the scaphoid and the semilunar. The metacarpus (MET.), or palm of the hand, consists of five bones which are jointed with those of the wrist at one end and with those of the fingers at the other. It is unnecessary to give the details of these articulations. The phalanges (PHAL.) are placed in rows. Of these each finger has three and the thumb two. The phalanges in the first row are jointed to the corresponding metacarpal bones, whilst each phalanx in the succeeding rows is jointed to that which immediately precedes it.

The bones just described are moved by the action of various muscles. It is of interest to notice that the muscles, besides their employment as stated above, also act as a covering to the bones of the arm. Every joint has connected with it at least two muscles whose actions are exactly the opposite of each other. For instance, the muscle which causes a joint to bend is called a "flexor" muscle, whilst that which straightens the joint is called an "extensor" muscle. Other analogous names are used in some cases, as will be seen in what follows. The upper arm is raised by the action of the "deltoid" (DEL.) muscle. This muscle forms the covering of the shoulder. The arm is lowered by the action of three muscles, the coraco brachialis (COR.) and two other muscles not shown in the diagram. These are the latissimus dorsi, the great muscle of the back, and the pectoralis major, the great muscle of the chest. The arm can also be moved forward and backward by the action of these three muscles. One of the most important flexor muscles is the biceps (BI.) which, assisted by the brachialis anticus (BRACH.) bends the forearm at the elbow. The arm is straightened by the action of the extensor muscle called the triceps (TRI.) The two bones of the forearm are made to revolve upon each other by the action of the pronator radii teres (PRO.) and the supinator radii longus (SU). The former turns the palm

of the hand downwards, whilst the latter turns it upwards. These actions are respectively called "pronation" and "supination." Pianoforte players will see the importance of these muscles in the performance of such passages as broken octaves, especially when taken at a high rate of speed. The muscles which bend the hand at the wrist towards the forearm are the flexor carpi radialis (FL. R.), the flexor carpi ulnaris (FL. UL.), and palmaris longus (PA. L.), and those muscles which restore the hand to its normal position are extensor carpi radialis longior (EX. R. L.), extensor carpi radialis brevior (EX. R. B.), and extensor carpi ulnaris (EX. U.) As may be deduced from their names, the two former extensor muscles are found at the radial side of the forearm, and the last muscle is at the ulnar side. The muscle which bends the first and second phalanges of each finger is called the flexor sublimis digitorum (FL. D.). The muscle which bends the third phalanx, the tip of the finger, is called flexor profundus digitorum. It is not shown in the diagram because it is placed underneath some of the other muscles. The tendon which is attached to the first of these two muscles divides into four portions, one of which is assigned to each finger. The tendon of the other muscle also divides into four portions, each of which is assigned to a finger. In order to pass to the tip of the finger the tendon passes through an incision in the corresponding tendon which belongs to the middle phalanx. The fingers are restored to their normal position by means of the extensor communis digitorum (EX. C. D.) which actuates certain tendons which do not require detailed notice. Owing to its more varied movements the thumb requires a greater variety of muscles than the fingers. Besides the flexors which bend the joints in the manner previously described with regard to the fingers, there are others which respectively enable the thumb to be extended from the fingers and to be pressed towards the palm of the hand. These muscles form the ball of the thumb and are as follows. The opponens pollicis (OP.) which bends the metacarpal bone, the flexor brevis pollicis (BR.) which bends the first phalanx and the flexor longus pollicis (LON.) which bends the second phalanx, the



abductor pollicis (AB.) which stretches the thumb and the adductor pollicis (AD.) which enables the thumb to pass under the hand. The importance of the last two muscles in scale and arpeggio playing is obvious. The extensor muscles of the thumb are the extensor ossis metacarpi pollicis (MET. POL.), extensor primi internodii pollicis (PR. INT.), and extensor secundi internodii pollicis (SEC. INT.), and they correspond respectively with the flexors previously described. The little finger has also provision for its extension from the fingers, the abductor minimi digiti (AB. MIN.). At the back of the hand, but placed between the metacarpal bones, are four small muscles called the dorsal interossei (DOR.). Their chief purpose is to separate or abduct the fingers. On the palm of the hand are three small muscles called the palmar interossei (PAL.). They act as adductors by bringing the fingers together. The lumbricales (LUM.) are small muscles which cover the lower part of the fingers. Their chief purpose is to assist in flexing the first phalanges of the fingers. Most of the muscles which have been described, in addition to their chief purpose, assist each other in various ways. A description of these would be very complicated and of doubtful value to the musical student, who is referred to medical textbooks for any further information on the subject. The positions of the muscles, as shown in the diagram, must be regarded as approximations only. For instance, the muscles which are placed on the forearm usually extend for a great part of the distance between the elbow and the wrist. This could not be shown without large and elaborate anatomical diagrams, which would be of no practical use to the readers of this book.

The upper extremity of each muscle is almost invariably attached to a bone. At its lower extremity there is, with few exceptions, a tendon by which the muscular action is transferred to the bone to which the tendon is attached. Commands to use the various muscles emanate from the brain through the efferent nerves. No detailed description of these nerves will be attempted here.

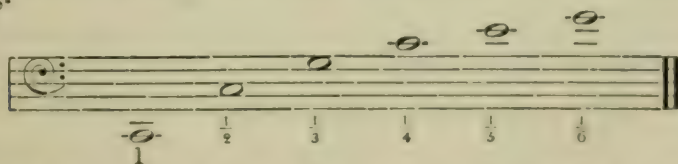
## APPENDIX B.

## PSEUDO-SCIENCE IN MUSIC.

By pseudo-science is meant a collection of laws which bear on any particular subject, but which do not represent a legitimate deduction from certain assumed principles. The principles which are assumed as the foundation of a pseudo-science may have no existence except in the minds of those who enunciate them. The "vortex" theory of Astronomy which was formulated by the great French philosopher, Descartes, is a very good illustration of a pseudo-science which has no foundation except in the mind of its inventor. A pseudo-science may have a foundation in fact, but the subsequent deductions which form its laws are unwarrantable and absurd. The pseudo-science of Phrenology is a good illustration of this plan. The formulation of a pseudo-science, being founded on *a priori* principles, very soon shows an accumulation of facts which are made to agree with these principles. Because of this easy accumulation of illustrations the advocate of a pseudo-science may show much arrogance in the display of his theories. True science, on the other hand, shows, in the proceedings of its votaries, an amount of modesty and diffidence in marked contrast to the assurance of the advocates of a pseudo-science. The most striking feature in Darwin's great works, "The Descent of Man" and "The Origin of Species" is his reluctance to deduce a principle, as the result of his accumulation of examples. So long as any further evidence can be obtained he prefers to suspend judgment. That is the way in which all true science is built up. The science of Geology is one of the latest in which what was a pseudo-science became, by the labours of such men as Sir Charles Lyell, a true science. In the early days of geological study its exponents

were restricted by the assumed date of the creation of the world to a period of about 6,000 years for the purpose of explaining all the phenomena which they observed in the crust of the earth. This gave rise to some of the most grotesque and preposterous theories. But when scientists began to see that the date of the Creation must have been a great many thousands of years prior to what it had been assumed to be, the way was opened for more rational views. The outcome of this was the enunciation of the grand principle of Uniformitarianism by Sir C. Lyell, not assumed *à priori*, but deduced as the result of many observations.

In music and cognate subjects there have been a good many examples of *à priori* principles which have been assumed without sufficient warrant. For the purpose of this essay it will be sufficient to glance briefly at one of the most conspicuous examples of a pseudo-science in the realm of music, the so-called "Day theory" of harmony. This theory is primarily founded on the divisions of a monochord. If a string is stretched over a resonance box we obtain approximately an assumed series of notes by causing this string to vibrate as a whole or in aliquot parts. For instance, if the string when vibrating to its entire length gives a certain note, we can obtain a note an octave higher by placing a bridge under the string in such a way that only half its length is allowed to vibrate. When we move the bridge to such a position that only one-third of the string vibrates we obtain a note a twelfth higher than the original note. So we may continue this process until we obtain the following result in which the original note, C, is represented by a whole number, and the other notes by fractions of the string.



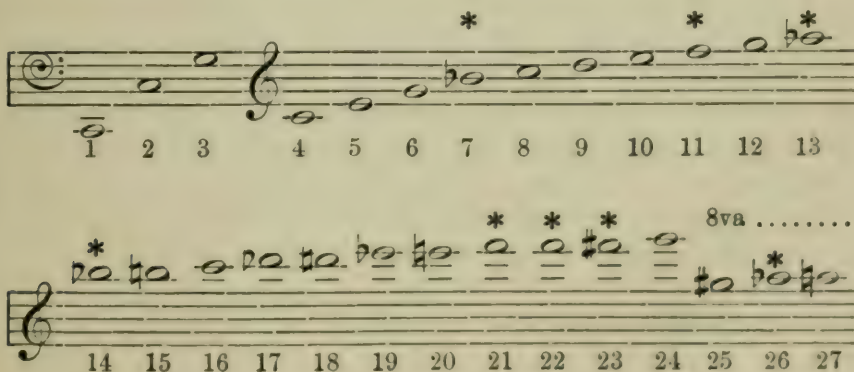
It was also observed that the same series of notes could be obtained on a stretched string by touching certain points called "nodes," when the vibrations, instead of extending the whole length of the string, were defined by the node in question, but



the rest of the string also vibrated in exactly the same manner. Hence when the string was touched at the centre the two sections of the string vibrated synchronously. Also when the string was touched at one-third of its length it vibrated in three sections, the pitch of each being as previously described. Further subdivision discloses the same phenomenon, but it is unnecessary to say more on the question. On a well-tuned *Æolian* harp it is possible to hear several of these notes at once. One string vibrates as a whole, whilst another gives the octave, because the action of the wind causes the string to vibrate in halves. Higher notes are produced from the other strings in accordance with the theory now propounded. From what has just been stated it will easily be inferred that all the strings of the *Æolian* harp must be tuned to the same pitch.

The phenomena just described are undoubted facts, and so far we are not concerned with any pseudo-science. But theorists observed that the series of notes on p. 159 were those of the major common chord. In connection with the string by which they were produced they were termed "harmonics" of its lowest note, and hence this note may be regarded as the fundamental note of the whole series. By an obvious transference of thought this fundamental note was regarded as the "generator" of the whole series. In a conventional or figurative sense this note may be regarded as a "generator," but the term does not describe any physical fact. In what sense can a note be said to generate another? There is no actual phenomenon which warrants such a term. Here we see the beginning of that pseudo-science of harmony which had a good many votaries before Dr. Day produced his celebrated theory. The first assumption by these theorists was that the notes of some chord were generated by a certain note. This may be accepted with certain reservations; but they go a step further and tell us that a chord can be generated by a generator which is not present. It is obvious that there is no actual generator when we have an inversion of a chord, or when its lowest note is less than an octave above the next higher note. Their next assumption was that any notes which might possibly

be produced by taking the higher harmonics of a stretched string may be added to the series of notes which have already been given. The following, which is the most complete series of such notes known to the present writer, is taken from a very curious book entitled "The True Science of Music" by D. C. Hewitt. As fractions would be confusing the notes are shown by successive whole numbers, thus giving their order in the so-called "harmonic chord." Also these whole numbers show the ratio of the vibrations in the different notes. Thus, if the first note has 100 vibrations the second note has 200, the third note has 300, and so on. In Hewitt's book only those notes are given which are represented by prime numbers. All the other notes are deduced from these prime numbers by the employment of the following simple formulæ. Let  $n$  represent the number of any note in the following scheme, then  $2n$  gives the note an octave higher,  $3n$  is a 12th higher,  $5n$  a major 17th higher. For the sake of completeness it may be mentioned that  $4n$  ( $= 2 \times 2n$ ) represents a 15th higher. The whole of the notes in the following scheme have been obtained by the employment of these formulæ. Very rarely the name of a note has been altered. For instance, Hewitt calls No. 17  $C\sharp$ , but in the following scheme  $D_b$  is substituted so as to conform to the notation of the Day theory.



\* These notes are more or less out of tune with those of the common scale of music.



This series of notes must be regarded as mere paper science, and by no means as the result of careful experiment. It is obvious that the whole of the notes "generated" by the fundamental note cannot appear at once in actual music, and hence we must assume that this fundamental note can make a suitable selection from them automatically, omitting all those that are not required. How this feat is performed no exponent of the Day theory has tried to show, but he has been content to make an assumption which cannot be justified.

We have seen that there was some slight justification for the Day theory, so far as the major common chord is concerned, if we accept the statement that such a chord is generated by its root. The minor common chord must next engage our attention. Observe that the root and 5th of such a chord can be obtained as previously described, whilst the minor third requires us to ascend in the harmonic series until we reach the note numbered 19. This note is adopted by D. C. Hewitt in his "True Science of Music," and also by the late Sir Frederick Ouseley in his treatise on Harmony, who says that "It is almost in tune." As it is quite certain that no one has ever heard this note as a portion of the harmonic series, the question arises, How is it obtained? Nothing can be simpler. It will be observed that the notes labelled 18 and 20 are a tone apart, and hence 19 must come midway between them, or nearly so. This deduction is probably true, but displays an



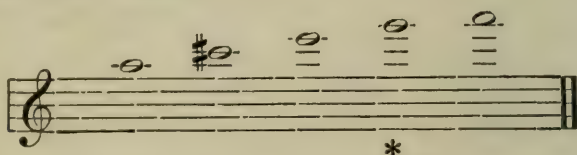
unscientific spirit which should breed suspicion in the mind of the thoughtful student. It is worth while to notice that the notes represented by prime numbers such as 19 have to be worked out in the manner just shown. Numbers such as 18 and 20, which can be resolved into factors, are obtained as products of the lower numbers in the series. The formulæ on p. 161 show the manner in which these lower numbers must be treated in cases such as those under consideration. If we refer to the lower notes we obtain 18 and 20 as follows:—

$$3 \times 3 \times 2 = 18, \text{ and } 5 \times 2 \times 2 = 20.$$

In the first example we take the note G, the first multiplier gives us the 12th higher, D, whilst the second multiplier gives its octave. In the second example we take the note E, the first multiplier gives us the octave E, whilst the second multiplier again raises this note an octave. If we accept the 19th note in the harmonic series as representing the 3rd of a minor chord we are still met by the difficulty of its evolution from its root. How can we believe that a “generator” can reject at will any or all of the lower notes in the harmonic series, reserving for actual use the 19th note? It is only necessary to make this statement to display its absurdity.

We have seen that the first six notes of the harmonic series represent the major common chord, but if we take in the next note a new difficulty awaits us. The Day theorist tells us that this new note, added to those which have gone before, gives us the chord of the dominant 7th. He is, however, compelled to admit that this new note is out of tune with our ordinary scale. Whilst acknowledging this fact he contends that the note is very slightly out of tune, so little in fact that it really does not matter. Here we have a striking example of the practice of the pseudo-scientist who first assumes a certain theory and then forces all his facts to correspond with this theory. How different is this from the procedure of the true scientist! He will assume a certain hypothesis, but it is instantly rejected if the facts are against it, as shown by careful investigation. When Kepler investigated the movements of the heavenly bodies he formulated

upwards of thirty hypotheses before he hit upon his celebrated Three Laws. The History of Science shows us countless instances of hypotheses which have been devised, carefully examined in relation to the phenomena they were supposed to explain, and finally rejected. The statement that the 7th note in the harmonic series is so slightly out of tune as to be a matter of indifference is quite contrary to all that we understand by the word science. Suppose a lecturer on Chemistry should say to his class, "Water is compounded of the two elements, oxygen and hydrogen, there being two atoms of the latter to one of the former. We always expect that the atoms of hydrogen have exactly the same atomic weight, but in this peculiar case one is slightly heavier than the other." We could not imagine any lecturer making so absurd a statement, yet it is quite as rational as the assumption of the Day theorist with regard to the dominant 7th. Very few persons have actually heard, distinctly and separately, the seventh note in the harmonic series, but a suitable experiment may easily be arranged by which this may be effected. Carefully bow the first string of the violoncello, touching with the tip of the forefinger a point  $\frac{1}{4}$ th from the upper end of the string. (The bow must be placed a little nearer to the bridge than in an ordinary performance.) When this note is quite clear move the hand slightly upwards until  $\frac{1}{5}$ th from the top of the string is touched, and afterwards touch in the same way  $\frac{1}{6}$ th,  $\frac{1}{7}$ th, and  $\frac{1}{8}$ th of the string. The complete series of notes are as follows, but it will be found that G is unpleasantly out of tune as compared with this note when it forms part of the dominant 7th.



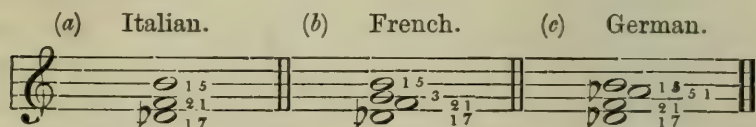
Accepting the Day theorist's view of the notes in the harmonic series we have now obtained the major common chord, the minor common chord, and the dominant 7th. Parenthetically it must be noted that this dominant 7th, as exemplified by the notes on

page 161, is in the key of F, and that this is the case with the combinations which remain to be described in this paragraph. The ninth note, added to those previously enumerated, gives us the chord of the major 9th, whilst the minor 9th is obtained by taking the note which is numbered 17. It is a curious circumstance that the root is almost invariably omitted in chords of the 9th. Yet this note, although absent, can generate its chord! The system of imaginary roots is one of the most grotesque features of many systems of harmony besides the Day theory. We come now to the so-called chord of the 11th, which is formed by adding the eleventh note in the harmonic series to those previously enumerated. Three remarks must be made with regard to this note. First, it is so much out of tune with our modern scale that it is rejected by Ouseley altogether, yet according to other Day theorists it is "generated" by its root, and hence can only be left out by the arbitrary wish of the theorist. Even his wish cannot be regarded if the generator does its duty. The second point is that the interval between the bass and the note under consideration may be reduced to a 4th, yet it is accepted by every theorist as an 11th, although it is perfectly well known that this note cannot be generated except from a note which is at least a 25th lower than itself. Thirdly, the presence of the new note actually forbids the generation of the 5th note in the harmonic series, whilst either of the 9ths obliterates the octave. If the 9th and 11th rise to their resolution, the process of obliteration follows the same lines. What has been said with regard to the obliteration of earlier notes in the series applies also to the 13ths. The minor 13th is the 13th note of the harmonic series, whilst the major 13th is the 27th note. Reasoning by analogy it is quite certain that the first of these two notes is out of tune with the ordinary musical scale, whilst it is more than likely that the other is almost equally so. Yet the Day theorist, like all those who regard induction as an unnecessary obstruction to their flights of genius, has never experimented in such a way as to prove the actual pitch of these notes. He is also quite oblivious of the fact that there is an interval of a 34th between the major 13th and its "generator,"

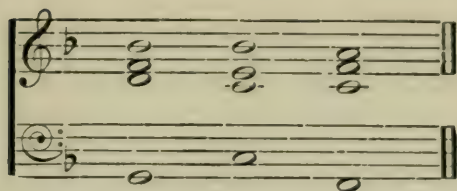


a condition which is never found in either ancient or modern harmony, even when in eight parts. So wide an interval may be met with in an orchestral score, but it must require the vivid imagination of an enthusiast to realise that a low note on the double bass can generate a high note on the piccolo.

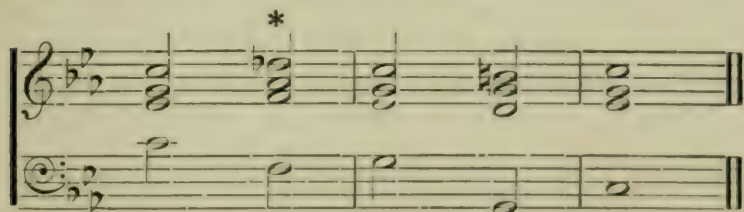
The invention of the so-called "double root" is one of the most amusing features of the Day theory. It was primarily devised for the explanation of chords of the augmented 6th. These roots were always a perfect 5th or 12th apart, and hence the higher of the two roots could be "generated" from the lower. If Dr. Day saw that such was the case, why should he have invented so extraordinary a device as the double root? The upper root is, of course, generated by the lower root, and therefore all the harmonics of the former equally belong to the latter.



The above chords are explained as follows, and all these statements can be verified by reference to the series of notes on pp. 161-2. The roots are C and G. In (a) D flat is generated by C, whilst F and B are generated by G, and the additional notes in (b) and (c) are generated by G. It will be observed that all the notes which are described as being generated by G can be found in the series of notes on pp. 161-2. This is shown by the numbers placed by the side of the notes in the chords. All the numbers which contain the factor 3, or, in other words, which correspond with the formula  $3n$ , are derived from the upper root. This remark also applies to the remaining illustrations in the paragraph. The fact that neither of the generators is present in chords of the augmented 6th is a matter of indifference to the Day theorist. It was said on p. 165 that Sir F. Ouseley rejected the 11th note as being so much out of tune as to be quite unavailable in actual music. To avoid this difficulty he had recourse to a double root.



The first chord in the above example is regarded by those who accept the Day theory to its fullest extent as an inverted chord of the 11th whose root is the dominant C. A reference to the harmonic series on p. 161 shows us that the notes in the chord, counting upwards from the bass, are represented by the numbers 3, 9, 11, 7. But Ouseley, whilst fully accepting the Day theory in most respects, prefers another interpretation of this particular chord. He says, "Whenever we find a chord with a minor third and a minor seventh, we may be sure it comes from two roots. For the minor seventh demands a *major* third or leading-note to enable it to resolve regularly." His solution of the chord in question is that the B $\flat$  is derived from the root C, and that the remaining notes are derived from G. As before we shall see that the whole of the notes can be derived from the series on p. 161, even if we disregard No. 11, which is so repugnant to our author. We can take this note as  $7 \times 3 = 21$ , thus showing that it must belong to the primary root C, because it is also derived from the secondary root. The chord then as derived from the primary "generator" C is represented by the numbers 3, 9, 21, 7.



The chord of the Neapolitan Sixth, shown by a \* in the above example, is also regarded by Ouseley as being derived from the roots C and G, D flat belonging to the former note and the remaining notes to the latter. An examination of the series

on pp. 161-2 will show that the whole of the notes might be "generated" by C, the numbers, counting from the bass, being 21, 51, 17.

Thus the notes of the harmonic chord were employed to demonstrate an absurd and impossible system of harmony. Seeing that these notes have an actual existence it is reasonable to suppose that there is some rational way in which they can be used, and that this would eventually be discovered. We find the first inception of such a discovery in the experiments of the philosophers Mersenne and Sauveur. In the latter part of the seventeenth century it was observed that a vibrating string can be divided by nodes, as described above, on pp. 159-60, and this fact was communicated to the Royal Society about the year 1677. But in the early part of the eighteenth century the above-named philosophers noticed that two or more of the notes of the harmonic chord could be produced at the same time on one string. From this it was inferred that two or more distinct sets of vibrations might co-exist in the same string, and that the nodes which were necessary for the production of their various sounds would not, in any way, interfere with each other. The matter was further investigated by Daniel Bernoulli, the eminent mathematician, who proved, in a memoir published in 1755, the principle of the co-existence of small vibrations. Other eminent mathematicians, such as D'Alembert and Lagrange, declined to accept Bernoulli's explanation of the phenomenon, although they were not able to deprive him "of the merit of having pointed out the principle of Co-existent Vibrations." In that monument of misdirected energy, "The True Science of Music," its author, D. C. Hewitt, says, "It is commonly supposed that the vibration of the basis (=the fundamental note) may be simultaneously accompanied with a variety of harmonic vibrations; but a moment's reflection will show that this is impossible, since the nodes of one harmonic must necessarily interfere with those of another, in every case, except that in which one harmonic is a sub-multiple of another." In other words the co-existent notes must be such that one, the so-called sub-multiple, is a factor of the



other, as 2 and 4, 3 and 6, 2 and 6, 3 and 9, but that harmonics whose numbers are prime to each other, as 2 and 3, cannot sound at the same time on one string. The very striking developments in the Science of Acoustics which have been made of late years prove that Hewitt was quite wrong in the statements which have just been quoted.

The co-existence of harmonic sounds on vibrating strings was regarded as a curious and isolated phenomenon of no great importance up to about the middle of the last century, when a very remarkable extension of the properties of the harmonic chord was discovered. This discovery was made by the great German scientist Helmholtz, and it was of the most unexpected character. By careful experiment he demonstrated the fact that the notes, however produced, which had always been regarded as simple tones are almost invariably compounded of two or more of the notes of the harmonic chord. Also that the quality of tone of any particular note was due entirely to the series of harmonics which were present coupled with their relative strength. His investigations which led to this result are a model of the inductive process. He first analysed a note by means of the employment of suitable resonators. This process of analysis was succeeded by that accumulation of results which we call synthesis. Helmholtz constructed an instrument which included a suitable number of the notes in the harmonic series. Any combination of these could be made to sound at will, and by this means he could imitate the tone quality of any instrument. It is difficult for us to realise that when we strike a note on the piano the string can vibrate in several ways at the same time. We have become so accustomed to regard each note which we produce as being simple, that we actually cannot consciously hear any of the additional sounds which make it compound. They are present, of course, but have been so welded together in our minds that we have the concept of a simple note. That this apparently simple note is composed of a good many sounds is amply proved by the slow beats of "equal temperament." The following simple experiment can be tried by anyone who possesses a piano, a bichord instru-

ment being most suitable for the purpose. Find a note in which the strings which form the unison are very slightly out of tune with each other. The higher notes are not convenient for this purpose because their tone vanishes too rapidly to allow of careful observation of the phenomenon now to be described. If this note is struck gently we have slow beats, but if we employ a little more vigour the beats are twice as quick, and this process may be considerably extended when the beats are correspondingly more rapid. It is obvious that the more rapid beats are due to the imperfect unisons between the upper notes in the compound series. It is very interesting to listen to the beats of a vigorously struck note, which become slower and again slower as the tone dies away. The higher notes vanish first, leaving those which are lower in pitch, and at last only the beats of the fundamental tone remain.

In the previous paragraph it is stated that the compound nature of all kinds of musical tones was discovered by Helmholtz. It is a curious circumstance that the effects which are a direct consequence of such harmonic combinations were discovered a good many years ago, and that they are obtained, in a crude form, on the organ by the employment of pipes of different pitch. Considerations of euphony were the guides by which the ancient organ builders decided empirically the relative pitches of the different stops which they employed, but the soundness of their work is amply shown by the researches of Helmholtz. The musical example on p. 159 gives us the relative pitches of their most frequently used stops. If the first note represents the Diapason, then the next four notes are respectively the Principal, the Twelfth, the Fifteenth, and the Tierce. It is unnecessary to enumerate any higher mixtures, as they would introduce nothing new in principle. Some purists amongst organists object to the Twelfth because they say that its use gives rise to consecutive 5ths. The compound nature of tones shows that this view is absurd and untenable. There is one detail in which the stops just enumerated fail to realise the more artistic effects of compound tones. They are relatively

much too loud as compared with their fundamental tone. More advanced scientific knowledge has had the result, in first-rate modern instruments, of modifying the tone of these notes of higher pitch, but they still leave much to be desired. On the older instruments the effect of some of their most shrill and piercing three- and four-rank mixtures is most unpleasant to modern ears. Here is an illustration of the effect which is produced by the modification of our concepts. Our forefathers revelled in solos played on an organ stop which was known as the "mounted cornet," and which might consist of as many as five ranks of pipes whose relative pitches were as the first five notes on p. 159. To us such solos would be intolerable.

Another interesting example of the empirical use of combined tones, such as we are discussing, is found in that plan of singing in 4ths, 5ths, or 8ves, which is known as Diaphony, and which was employed in the ninth century, or even earlier. The effect of consecutive 4ths or 5ths is so unpleasant to our ears, especially when unaccompanied by other notes which may mollify their harshness, that we find it difficult to realise that they were ever acceptable to musicians, whilst some authorities declare that this is impossible. The late Sir G. Macfarren was most emphatic on this point. He says:—"It is incredible that simultaneous singing in 5ths or in 4ths can ever have been authorised; and the appropriation of the term diaphony to singing in 8ths may be supposed to be erroneous. It seems likely that the term may have meant alternation or repose, and that the parts which, in ancient copies, stand one over another at the interval of a 5th, a 4th, or an 8th, were sung in succession and not together, their presentation in writing having no analogy to the modern idea of a score. This is but a conjecture, whose proof must rest with the antiquary; but it is based on the natural rule of reason, that progressions, which are now in the highest degree offensive to the ear, can never have been habitually performed or authoritatively sanctioned." If we believe in the efficacy of concepts for modifying our reception of various mental impressions we shall by no means accept such a statement as this, even when we know that it



expresses the deliberate opinion of so eminent a musician and so thoughtful a student as Sir G. Macfarren.

Examples can be found in which the ear accepts at one time what would be most repugnant at another. For instance, we have become so accustomed to the prevarications of the equal temperament that their harshness is quite lost sight of in an ordinary performance on a keyed instrument such as the piano. But let the ear have a favourable opportunity of listening to examples of pure intonation, and the peculiarities of equal temperament become most offensive. One such experiment is within the range of most musicians. On an ordinary harmonium, press down the notes of a major triad. The middle note of this triad is much too sharp, but its harshness is scarcely, if at all, observed. Whilst still holding the triad allow the middle note to rise a very little. This will cause it to flatten, and, with a little care, the triad can be made almost pure. After permitting the ear to drink in the smoothly flowing chord for a few moments suddenly press down the middle note, when the chord will appear in all its original deformity, and it will be almost intolerable to the experimenter.

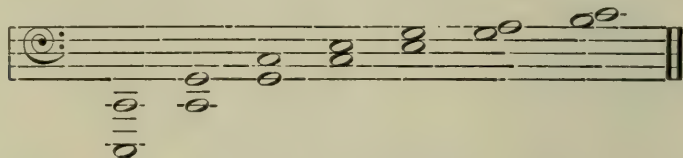
On two occasions the present writer has happened to hear performances which must have sounded very much like the ancient diaphony. The children of a village day school were singing a song which was almost exclusively composed of ascending and descending 2nds, with an occasional leap of a 3rd, thus resembling the examples of diaphony to be met with in books. The schoolmaster accompanied them with his voice in what he imagined to be a bass, but which was, in reality, the melody an 11th lower in pitch than as given by the children. The master's voice was by no means strong, and the result was a dim, ghostly effect which was certainly odd, but not unpleasant. The other occasion was when a number of schoolboys managed to borrow the instruments of a defunct fife and drum band. One of the boys was sufficiently musical to be able to teach the natural scale of the piccolo to the others—that is the key whose tonic is represented by the note which is produced when all the holes of the instrument are covered by the fingers. There was

no attempt to play by notes or in parts. Instead of this, each boy played the same tune, but as the piccolos were of different sizes the effect was very striking. To hear the boys, whilst marching through the streets, play the latest popular song in consecutive 5ths was very comical, but to the musician who could ignore the rules of elementary harmony the effect was by no means harsh. If effects such as these can be tolerated by a musical ear in these enlightened days, it is easy to imagine that our forefathers would regard similar combinations as most striking and gorgeous.

Although the great discoveries of Helmholtz were announced more than a generation ago they have not been employed by the average English theorist; in fact, so far as he is concerned Helmholtz's treatise on Acoustics might just as well have remained unwritten. The only example to the contrary known to the present writer, is the treatise on Musical Statics by the late John Curwen. Professor Sully also, in his "Sensation and Intuition," refers to the discoveries of Helmholtz in relation to music. The main idea of the theorist who tries to devise a new system of harmony is that a series of 3rds must be built up from the particular starting point which he favours. Why one starting point is favoured rather than another is a mystery, because an ascending succession of 3rds very soon includes every note in the diatonic scale. If to this is added the fact that each of these notes can be inflected by flat or sharp, it will be seen how jejune and ineffective the theory evolved must be. It is a question of "heads I win, tails you lose," in which any harmonic combination can be justified by the simple art of "begging the question."

The question of the conditions under which dissonance occurs was answered by Helmholtz in a manner which shocked the orthodox theorist. Helmholtz says that dissonance is greatest between two notes of which one has 33 vibrations per second more than the other. To this it was objected that, very low down in the scale, a note and its octave are 33 vibrations apart, whilst the same phenomenon occurs with regard to the interval of the 5th if we take two notes which are a

little higher in pitch than those previously indicated. Still ascending, we come successively to the perfect 4th, the major 3rd, and the minor 3rd, of which the two notes in each case are 33 vibrations apart. The intervals in the following example illustrate what has just been said, the higher note in each case having, approximately, 33 vibrations more than the lower note.

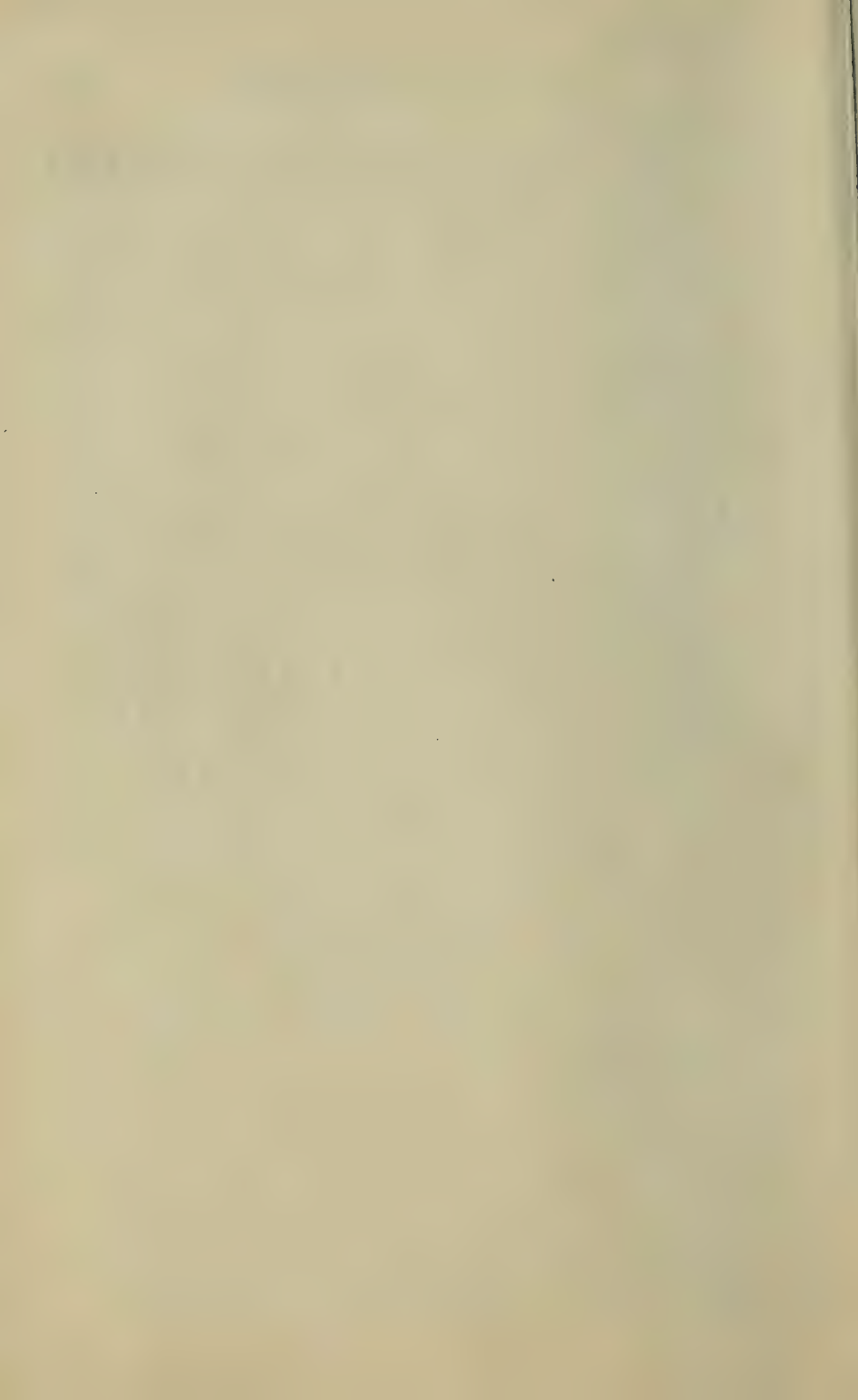


The preconceived notions of the orthodox theorist could never admit that an octave might be dissonant under any circumstances. To such a one it is sufficient to reply that it is a mere misuse of terms to say that an octave on the deeper pedals of the organ has any of the characteristics of this interval as we usually understand it. Also a perfect 5th on the pedals is a very harsh interval, which, if the ear may be permitted to judge, is the reverse of concordant. The deep notes played by the double-basses and the bassoon in the opening of Tschaiakowsky's "Pathetic Symphony" cannot by any stretch of the imagination be regarded as concordant, and it is only by a very large assumption that they can be regarded as music. Other examples could be given of the repugnance which the theories of Helmholtz have excited in the mind of the musician. Yet this great philosopher, commencing with the meagre details which are found in the books on Natural Philosophy which were in vogue half-a-century ago, was able to amplify and systematise the Science of Acoustics until it is worthy to stand in line with such great deductive sciences as Astronomy, Light, and Chemistry. These sciences have been gradually formulated, through a long series of inductions, by the exertions of many scientists, until at last their fundamental principles were enunciated with the result that they have become deductive. But in the case of Acoustics the same result was attained by the unaided genius of the great



philosopher Helmholtz. This being the case it is much to the discredit of the orthodox theorist that no serious effort has been made to utilise his deductions.

The question may be asked: Seeing that music is a Fine Art, can it be expected that it should be governed by the precise rules of a science? In reply it may be remarked that the phenomena of Acoustics must be present in every musical performance. What relationship the latter may bear to the former we do not know, but it must be capable of exact formulation. What has been said equally applies to the Pictorial Art. The objection may be made that a picture is a work of art, but it is quite certain that no really first-rate painting violates the rules of linear perspective. No amount of felicity in the selection and combination of colours can make up for laxity in this matter. If such is the case with respect to painting it must also apply to combinations of sounds, and it is to be hoped that some of the more thoughtful amongst the younger members of the musical profession may find it of interest to unravel the difficulties which beset the correlation of the Science of Acoustics with the Art of Music.



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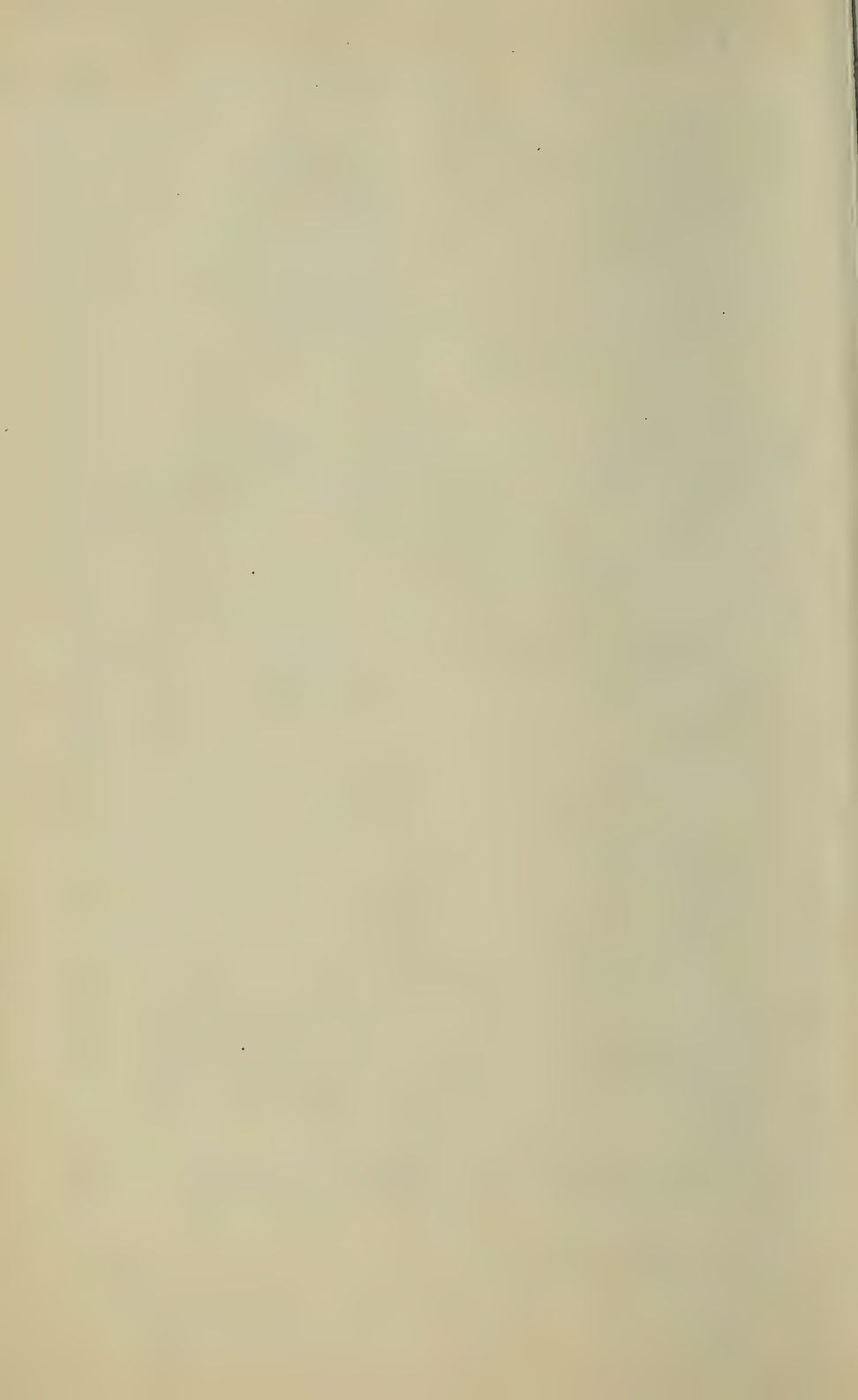
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